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THE PAN-PACIFIC ENTOMOLOGIST

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The Pan-Pacific Entomologist

Vol. XXXVII July, 1961 No. 3

A REVIEW OF THE GENUS CONANTHALICTUS[1]

(Apoidea: Halictidae)

P. H. TIMBERLAKE

University of California, Riverside

The genus *Conanthalictus* is known from the southwestern United States and is composed of small bees which collect pollen almost exclusively from the hydrophyllaceous genera *Nama*, *Phacelia*, and *Emmenanthe*. Of the seven species previously described, two are recorded from Texas, one from New Mexico, and four from California. Eight additional species from California are described herewith, seven in the subgenus *Phaceliapis*, and one in *Sphecodosoma*. These new species are from *Nama* or *Phacelia*, except one which is known to collect pollen from the loasaceous genus *Mentzelia*.

The types of the new species are in the collection of the Citrus Experiment Station at Riverside, but will eventually go to the California Academy of Sciences.

Subgenus PHACELIAPIS Michener

KEY TO THE SPECIES

1. Males 2
– Females 12
2. Mandibles rather short, with a small inner tooth; head about as broad as long; scape of antennae short and more or less thick; mesonotum usually more or less tessellate and dull, but not as dull as the frons; abdomen green 3
– Mandibles longer, either obliquely contracted on inner margin near apex, or with an obtuse or truncate inner tooth and a more or less elongate and slender apical tooth; scape of antennae usually slender 4
3. Scape of antennae about twice as long as thick; scapes and face near antennae with rather dense white hair; mesonotum less strongly tessellate and more shining than in *bakeri* ..... *wilmattae* Cockerell
– Scape of antennae distinctly more than twice as long as thick; white hair on sides of face opposite antennae thin and inconspicuous; mesonotum usually comparatively strongly tessellate ..... *bakeri* Crawford
4. Mandibles with a more or less elongate and slender apical tooth 5
– Mandibles comparatively short, hardly expanded within and obliquely contracted near apex without formation of an inner tooth; head not enlarged, subrotund, and no broader than long; dark bluish olive-green species; length about 6.5 mm ..... *caerulescens* Timberlake

[1] Paper No. 1289. University of California Citrus Experiment Station, Riverside, California.

5. Mandibles with a subacute or truncate inner tooth.....6
– Mandibles subdilated within, obliquely contracted at three-fourths of the length to form a slender apical tooth; head broad, the antennae short; dark bluish-green species; length about 4.5–4.7 mm. .....*namatophilus* Timberlake

6. Mandibles with a subacute or obtusely rounded inner tooth; hair of hind tibiae or that of basitarsi comparatively coarse or dense, white and conspicuous 7
– Mandibles with a broadly truncate inner tooth; hair of hind tibiae and basitarsi comparatively short, fine or brownish.....9

7. Small species of the deserts; hind basitarsi with a long dense white fringe on anterior margin.....8
– Cismontane species; hair of hind tibiae conspicuously coarse and mosslike, the hind basitarsi without a fringe; dark green, the abdomen blackish; head broad, the antennae short; length about 5 mm. .....*seminiger* Michener

8. Apical margin of segments 4 and 5 of venter transverse with a small median protuberance, tufted with very short fine hair; impression on each side of segment 6 large, the median elevation rather narrow and ridged; dark blue-green, the abdomen blackish; length about 4.5 mm. .....*deserticola* Timberlake
– Similar to *deserticola*, but segments 4 and 5 without a small medio-apical proturberance, and median part of segment 6 less ridgelike; apical half of anterior margin of hind tibiae with a dense white fringe; length 3.5 mm.....*minor* Timberlake

9. Smaller species; apical margin of segment 5 of venter transverse with a rather large rounded protuberance on each side.....10
– Apical margin of segment 5 somewhat bisinuate with short dense hair but not protuberant on each side.....11

10. Second segment of venter with dense white hair across the apical half, and a small tuft of white on apical corners of segments 3 to 5; head broad, the antennae rather short and moderately clavate; length about 5 mm.....*macrops* Cockerell
– Similar to *macrops*, but second segment of venter with sparse fine hair, and following segments weakly tufted on each side; antennae slender and weakly clavate.....*cockerelli* Timberlake

11. Cismontane species; antennae rather short, moderately clavate; head broad, inner orbits somewhat divergent in front; inner tooth of mandibles broad and obliquely truncate; head and thorax dark green, the disk of mesoscutum and scutellum almost black.....*nigricans* Timberlake
– Desert species; head very broad, with inner orbits strongly diverging in front; antennae much longer and more clavate than in other species; inner tooth of mandibles with the truncation moderately broad and retuse; head and thorax dark blue-green, the mesonotum more or less weakly tessellate and shining; length about 6.5 mm. .....*mentzeliae* Timberlake

12. Abdomen distinctly green 13
– Abdomen black or ferruginous 15
13. Mesonotum shining, more weakly tessellate; face opposite antennae with conspicuous white hair 14
– Mesonotum usually strongly tessellate and dull; face opposite antennae with comparatively thin white hair ..... *bakeri* Crawford
14. Dark blue-green, the mesonotum more or less shining, with fine, usually sparse punctures; length about 5.5 mm. ..... *wilmattae* Cockerell
– Dark olive-blue, with disk of mesoscutum and scutellum black; mesonotum moderately shining, with moderately close punctures on the scutum, the scutellum almost impunctate; length 6 mm. ..... *caerulescens* Timberlake
15. Abdomen black 16
– Abdomen ferruginous 17
16. Blackish species, with head, pleura, and propodeum blue-green; mesonotum tessellate, moderately shining, and sparsely punctured; length about 5.5 mm. ..... *nigricans* Timberlake
– Similarly colored, but mesonotum more strongly tessellate, dull, and hardly punctured; length 4–4.5 mm. ..... *seminiger* Michener
17. Mesonotum strongly tessellate, about as dull as the frons; smaller, not over 5 mm. in length 18
– Mesonotum weakly tessellate, shining, with moderately close fine punctures; head slightly broader than long, the inner orbits somewhat diverging in front; length about 7 mm. ..... *mentzeliae* Timberlake
18. Disk of mesoscutum and the scutellum black and nearly opaque 19
– Mesonotum dark blue-green, or somewhat brassy green, and strongly tessellate but a little shining in some lights; abdomen dark ferruginous, more or less infuscated at base and on lateral margins; length about 5 mm. ..... *macrops* Cockerell
19. Larger species; abdomen without white hair on each side of apical margin of tergites 20
– Smaller, not over 4 mm. in length; abdomen with white hair on each side of tergites 1 to 4, forming broadly interrupted bands ..... *minor* Timberlake
20. Abdomen dark ferruginous; head somewhat broader than long, the inner orbits diverging in front; form rather robust; length about 5 mm. ..... *cockerelli* Timberlake
– Abdomen light ferruginous; head about as broad as long, the inner orbits nearly parallel; form more slender; length about 4–5 mm. ..... *namatophilus* Timberlake

CONANTHALICTUS BAKERI Crawford

C. bakeri is a common vernal species in the cismontane area of southern California at flowers of *Phacelia distans* and *P. tanacetifolia*. I have seen it from Riverside, The Gavilan, Whittier, the Puente Hills near Whittier, Altadena, Balboa, Acton, and Mill Creek Canyon, San Bernardino Mountains (about 4400 feet). The

type locality is Claremont. It also occurs on the Mohave Desert and specimens are at hand from 11 miles west of Palmdale (Van Duzee), Valyermo, 10 miles southwest of Victorville (Timberlake), the Kramer Hills (Linsley, Stage and Powell), Independence (collector unknown), Mazourka Canyon, 6000 feet, Inyo Mountains, on *Phacelia*, June 1, 1937, and summit of Westgard Pass, June 15, 19, 1937 (Michener). Some of these desert specimens have the mesonotum almost as shiny as in *wilmattae* and intergradation with that species is a possibility.

CONANTHALICTUS WILMATTAE Cockerell

This species occurs on the Colorado Desert at flowers of *Phacelia distans*. The type locality is Tub Springs, Borego Valley, California. I have seen it from Palm Springs, Lost Palm Canyon, Salt Creek, and four miles east of Shavers Well, Riverside County; Beals Well, Imperial County; and Morongo Valley, San Bernardino County.

One female from Morongo Valley, April 21 (Cockerell) differs in the narrower head and is possibly distinct.

Conanthalictus caerulescens Timberlake, new species

C. caerulescens is dark olive-blue with the disk of the mesoscutum and the scutellum black in the female. In the male the mandibles are simple, tapering and hardly dilated within, and the sixth ventral segment is armed with a pair of spines on each side of a low, rounded medio-apical prominence, with the two inner spines rather long, curved and directed horizontally outward.

Male.—Dark olive-blue, the apical depressions of tergites and the disk of pygidial plate brown. Base of mandibles, labrum and clypeus black, and the apical two-fifths of mandibles red. Antennae black, the flagellum brownish beneath. Legs blackish, the tarsi more brownish and the spurs testaceous. Tegulae amber color. Wings moderately dusky hyaline, the nervures and stigma brown, and subcosta fuscous. Head as broad as long, the inner orbits of eyes parallel. Mandibles hardly dilated, obliquely narrowed within close to apex to form a subacute apical tooth. Antennae reaching middle of mesoscutum, with the pedicel slightly longer than the first joint of the flagellum, and the middle joints of flagellum a little longer than thick as seen from above. Venation normal, the third submarginal cell narrowed one-half above. Sixth ventral segment of abdomen with a transversely oval, subapical pit on each side and between the pits a low rounded ridgelike prominence; each pit armed with two spines, the longer one on margin of inner end of pit, curved slightly downward and directed subhorizontally outward; the smaller spine on posterior margin of pit, halfway to the lateral margin and directed downward. Head and thorax minutely tessellate and dull, with minute sparse and obscure punctures on mesoscutum and a few larger

shallow punctures on the clypeus. Basal area of propodeum large, subhorizontal and minutely granular. Abdomen microscopically lineolate with a satiny luster and with sparse minute punctures on the apical half. Pubescence white, rather short, thin and erect on the mesonotum, dense and more plumose on each side of face opposite the antennae and moderately dense on the cheeks; hair of abdomen thin and subdepressed, and that of the apical fimbria longer and brown. Length, 7 mm.; anterior wing, 4.5 mm.

Female.—Similar to male, but mesoscutum except on anterior border and the scutellum black. Mandibles red at middle and black at base and apex. Flagellum more reddish brown beneath than in male. Legs dark, the hind tibiae and tarsi brown. Antennae short, subclavate, with the joints of flagellum thicker than long. Mandibles with a small inner tooth. Pygidium moderately broad at base, with the sides concavely arcuate to the subacute apex. Sculpture similar to that of male, but the mesonotum more shining, with the punctures of the scutum very fine but distinct. Pubescence similar, the apical fimbria of abdomen tinged with fuscous. Hair of middle and hind legs pale brownish, with that on outer side of middle tibiae and basitarsi short, dense and plumose, and the scopa of hind tibiae rather short, dense and moderately plumose. Length, 6 mm.; anterior wing, 4.4 mm.

Holotype male and allotype from BOX CANYON, RIVERSIDE COUNTY, CALIFORNIA, on *Phacelia crenulata*, April 4, 1937 (Timberlake).

Conanthalictus nigricans Timberlake, new species

The male of *nigricans* has a broad truncate inner tooth on the mandibles as in *C. macrops* Cockerell, but this species differs from all other *Phaceliapis* except *C. seminiger* Michener in having the abdomen black. It is found principally on large-flowered species of *Phacelia*, such as *P. grandiflora* and *P. minor*.

Male.—Head and thorax dark bluish-green, the labrum and clypeus black. Abdomen black, with the apical depression of tergites brownish. Base of mandibles black, the apical half rufotestaceous, becoming redder at apex. Antennae and legs blackish, the flagellum brownish beneath and the tibial spurs pale testaceous. Tegulae testaceous. Wings dusky hyaline, the nervures brown, subcosta and margins of stigma fuscous. Head a little longer than usual, distinctly broader than long, the inner orbits diverging in front. Mandibles large, with the inner dilation ending in a broadly truncate tooth and the apical tooth moderately long and slender. Antennae reaching about the tegulae, with the middle joints of flagellum about one and one-fourth times longer than thick and the first joint a little longer than the second and nearly equal to pedicel. Head and thorax finely tessellate and dullish, the basal area of propodeum finely granular and opaque. Abdomen minutely shagreened and dullish, but the venter shining. Pubescence whitish, rather long, erect, plumose and moderately abundant, with the apical fimbria of abdomen brown to fuscous. Hair of abdomen otherwise mostly fine and appressed, but becoming more erect toward sides of tergites. Venter mostly

nearly nude, except for thin hair on apical part, which forms a definite apical fringe on segment 4. Apical margin of ventral segment 5 slightly bisinuate, with a fine short fringe, which becomes dense and plumose on a slight prominence far to each side, and the apical corners of segments 3 and 4 with a tuft of much longer dull whitish, plumose hair. Median third of apical half of segment 6 convex and protruding apically as a short rounded lobe, fringed with short fuscous hair, and the disk on each side of the prominence with a deep impression which is open outwardly and narrowed much more than one-half at inner end; inner half of posterior wall of the impressions in the form of a low angular lobe and armed with a short spine inwardly and then with a clump of two or three spines so close together that they appear to form a blunt projection. Length 4.5–6 mm.; anterior wing, 3.5–4 mm.

Female.—Head and thorax dark green, with the clypeus, mesoscutum except anterior border, and scutellum black. Abdomen black, with apical margin of ventral segments and apical depression of tergites brownish. Mandibles rufotestaceous becoming more reddish at apex and blackish at base. Antennae blackish, the flagellum reddish-brown beneath. Legs blackish, with nearly the basal half of hind tibiae ferruginous above and behind and the tibial spurs testaceous. Tegulae and wings as in male. Head somewhat broader than long, the inner orbits a little divergent anteriorly. Mandibles with a small inner tooth. Antennae hardly clavate, the joints of flagellum mostly slightly shorter than thick. Pygidial plate triangular, subacute at apex, but usually hidden by the fimbria. Head and thorax finely tessellate and moderately dullish, but the disk of mesoscutum and the scutellum sometimes rather shiny. Frons with numerous, but widely separated, minute punctures, and those of mesoscutum much sparser. Basal area of propodeum granular and opaque. Abdomen minutely shagreened and duller than thorax. Pubescence whitish, much as in the male, with the apical fimbria fuscous; gradulus of tergites 2 to 5 with a fringe of short fine hair. Hair of hind knees brown and scopa of hind tibiae tinged more or less with brownish ochreous, especially over the ferruginous part of surface. Ventral segments 2 and 3 with moderately dense erect hair across the apical half or a little more of the disk. Length, 5–5.5 mm.; anterior wing, 3.3–3.8 mm.

Holotype male and allotype from RIVERSIDE, CALIFORNIA, on *Phacelia minor,* April 22, 1927 (Timberlake). Also the following paratypes: 72 males, 34 females, Riverside, on same flower, except 2 females on *Phacelia distans* but not collecting pollen, and 1 male on *Cryptantha intermedia,* the males March 5 to April 22 and the females from March 5 to May 6 in different years; 3 males, 3 females, The Gavilan, Riverside County, on *P. minor,* except 1 male on *Cryptantha* and another on *Emmenanthe,* March 15 to April 27; 3 males, La Crescenta, Los Angeles County, on *P. minor,* April 28, 1934, and May 5, 1935; 10 males, 1 female, Mill Creek, San Bernardino

Mountains, 3500 feet, on *Phacelia brachyloba* (female collecting pollen), May 30, 1936 (Timberlake); 1 male, 4.5 miles south of Camp Angelus, San Bernardino Mountains (probably about 4000 feet, Mountain Home Creek), July 1, 1940 (collector unknown); 8 males, 2 females, Camp Angelus, on *Phacelia douglasii*, June 28, 1952 (R. H. and T. D. Beamer, W. La Berge, A. Wolf, Chang Liang, and C. Weiner); and 40 males, 59 females, San Marcos Ranch, Santa Inez Mountains, Santa Barbara County, on *Phacelia grandiflora*, July 5, 1956 (E. G. Linsley and P. D. Hurd, Jr.).

CONANTHALICTUS SEMINIGER Michener

The type locality of *seminiger* is the Eagle Rock Hills, Los Angeles County, California, and the type female was collected by Michener at flowers of *Rhamnus crocea*. It has been taken elsewhere at flowers of *Emmenanthe pendulifera* from which the female collects pollen. I have collected this species at Whittier, Riverside, and The Gavilan in the counties of Los Angeles and Riverside.

Conanthalictus deserticola Timberlake, new species

This is the smallest of the California species. The male is distinguished by having the hind tibiae and basitarsi with dense white hair and the apical margin of ventral segments 4 and 5 simple. The female has a red abdomen and is distinguished from other similar species by the small size and the white hair on each side of the apical margin of tergites 1 to 4.

Male.—Head and thorax blue-green, the clypeus and abdomen black, with apical depression of tergites somewhat reddened. Legs and antennae blackish, the flagellum more brownish. Mandibles rufotestaceous, becoming blackish at base and apex. Tegulae testaceous hyaline. Wings hyaline, the nervures testaceous, the subcosta, margins of stigma and metacarpus fuscous. Head about as broad as long, the cheeks one-half as wide as eyes. Mandibles slender, with an acute inner tooth and a long slender apical tooth. Antennae short, weakly clavate, the scape about four times longer than wide, the middle joints of flagellum somewhat thicker than long. Second submarginal cell more or less short, or twice or more as high as long. Head and thorax finely tessellate, rather dull and impunctate, but the clypeus smooth and shining and basal area of propodeum granular-tessellate and duller than other parts. Ventral segments 4 and 5 simple across the apex, but 5 with a minute tubercle at apical corners. Segment 6 with a large deep impression on each side, with the apical middle a little produced and prominent and invested with very fine short hair. Hind tibiae clavate, flat on inner side, its anterior margin on apical half with rather long,

dense white hair. Hind basitarsi about four times longer than wide, a little longer than following joints combined and clothed beneath with dense white hair which projects from the anterior margin. Pubescence of head and thorax white, dense on sides of face opposite antennae, moderately thick on cheeks and sides of thorax, long, thin and coarse on anterior third of mesoscutum and across apical part of scutellum. Basal margin of the apical depression of the abdominal tergites with white hair on each side of the segments, and the dense apical fimbria brown. Length, 3.5 mm.; anterior wing, 2.5 mm.

Female.—Head and thorax blue-green, the frons and vertex appearing almost blackish in some aspects, and the clypeus, disk of mesoscutum and the scutellum black. Abdomen bright ferruginous, the foveal impression on each side of tergite 2 not much darkened. Legs black, the hind tibiae and tarsi ferruginous. Antennae black, the flagellum more brownish and becoming paler beneath. Mandibles ferruginous. Tegulae and wings as in male. Sculpture and pubescence much as in the male, but the frons with a few scattered minute punctures. Antennae slightly shorter and more clavate than in the male. Length, 4 mm.; anterior wing, 2.4 mm.

Holotype male collected about halfway between MECCA and DOS PALMAS, RIVERSIDE COUNTY, CALIFORNIA, on *Nama demissum*, March 19, 1927 (Timberlake); 3 males, 1 female (paratypes and allotype), 27 miles north of Vidal, San Bernardino County, April 13, 1958 (J. W. MacSwain); 2 males (paratypes), Glamis, Imperial County, on *Nama demissum*, April 3, 1960 (Timberlake); 1 male (paratype), 12 miles north of Ogilby, on *Oenothera clavaeformis*, March 14, 1960 (P. H. Raven).

Conanthalictus namatophilus Timberlake, new species

The male of *deserticola* has conspicuous white hair on hind basitarsi as in *minor*, but ventral segments 4 and 5 of abdomen are armed apically with tubercles, a median one on segment 4 and median and lateral ones on segment 5.

Male.—Head and thorax dark blue, the clypeus black. Abdomen blackish, with the apical depression of tergites, especially that of tergite 1, reddened. Antennae and legs blackish, more or less tinged with brown. Mandibles becoming more yellowish at middle and red at apex. Tegulae testaceous hyaline. Wings slightly dusky hyaline, the nervures brownish testaceous, with the subcosta, outer margin of stigma and metacarpus fuscous.

Head large, somewhat broader than long and broader than thorax, the cheeks almost as broad as the eyes. Mandibles strongly curved, with an obliquely truncate inner tooth, moderately dilated at middle third before the tooth, and with a long slender apical tooth. Antennae slender, the scape about five times longer than wide, and the flagellum cylindrical, only slightly increasing in thickness apically and with the middle joints as long as thick. Second submarginal cell moderately narrowed above, with the first three abscissi of the radius about equal. Head and thorax dull from a minute

tessellation, the face opaque and impunctate, and the basal area of propodeum more granular-tessellate than other parts. Abdomen microscopically lineolate and dull, the venter finely tessellate and more shining and with fine scattered punctures, not numerous except on segment 5. Ventral segments 4, 5 and 6 each with a small median protuberance at apex, invested with short fine hair and segment 5 with a similar protuberance on apical corners. Segment 6 deeply foveate on each side of apical half, with the median elevation rather sharply tectiform and produced almost spurlike apically; apical margin of this segment with about three small erect spines far to each side. Hind tibiae only moderately thickened apically, with the white hair on anterior margin toward apex much less developed than in *minor*. Hind basitarsi about five times longer than wide, with the white hair on under surface forming a dense fringe on anterior margin. Pubescence of head and thorax white, dense on sides of face opposite antennae and otherwise much as in *minor*, except that the hair of mesonotum is fine and more evenly distributed; white hair on each side of apical margin of the tergites also less developed than in *minor* and is most noticeable on tergite 2; apical fimbria of abdomen brown. Length, 4–5 mm.; anterior wing, 2.5–3 mm.

Holotype male from SALT CREEK, RIVERSIDE COUNTY, CALIFORNIA, on *Oenothera brevipes*, March 19. 1927; and 1 male (paratype), 7.5 miles south of Twentynine Palms, Joshua Tree National Monument, Riverside County, on *Nama demissum*, May 7, 1948 (Timberlake).

Conanthalictus minor Timberlake, new species

The male of *namatophilus* has the mandibles slender, with a narrow inner dilation which passes obliquely and more or less abruptly into the rather long and tapering apical tooth. In regard to this character it is similar to *caerulescens* but the female has the abdomen light ferruginous.

Male.—Head and thorax dark blue, or blue-green, the clypeus black. Abdomen with a slight greenish tinge, the venter and apical depression of tergites brownish and pygidial plate of tergite 7 rufotestaceous. Mandibles blackish at base, testaceous at middle and red at apex. Antennae and legs blackish, tinged more or less with brown, especially on flagellum and the tarsi, with apical joint of tarsi more distinctly brown. Tegulae testaceous hyaline. Wings dusky hyaline, the nervures and stigma brownish testaceous, with subcosta and sometimes the margins of stigma dark brown to fuscous.

Head rather large, broader than thorax and broader than long, with the inner orbits of eyes somewhat diverging anteriorly. Antennae rather short, although relatively somewhat longer than in *bakeri*, with the joints of flagellum about as long as thick, except the second which is somewhat shorter. Head and thorax nearly uniformly and finely tessellate and dull and without distinct punctures except on the clypeus. Abdomen minutely shagreened and dullish. Pubescence white, moderately thin and erect, becoming denser and plumose on sides of face opposite the antennae; apical

fimbria of abdomen brown. Venter with rather close-set, fine, appressed hair, and segment 5 with a little clump of short brown hair on a small rounded protuberance on each side of the apical margin. Segment 6 of venter having the median fourth of apical margin convex, slightly produced and invested with short pile, and excavated on each side, the excavations open anteriorly and outwardly, with the inner margin of the pit armed with one small spine and the posterior margin with three close together. Length, about 4–4.5 mm.; anterior wing, 3–3.5 mm.

Female.—Head and thorax dark blue-green, the clypeus, mesoscutum except anterior third and scutellum black. Abdomen ferruginous red, of a somewhat paler shade than in *macrops, cockerelli,* and *mentzeliae.* Mandibles testaceous, a little darker at base and red at apex. Scape and pedicel of antennae blackish, the flagellum brown. Legs blackish, the knees, tibiae and basitarsi of hind legs usually ferruginous, and apex of front and middle tibiae also often brown. Tegulae and wings as in the male.

Head as long as wide and hardly wider than thorax. Antennae short and somewhat clavate, the joints of flagellum thicker than long, but flagellum a little more slender than in the female of *bakeri.* Mandibles tapering, with a small inner tooth. Pygidial plate very narrowly rounded at apex. Sculpture and pubescence about as in the male, the apical fimbria of abdomen pale brown. First two segments of venter with rather short, erect and moderately dense hair, with that of the following segments becoming increasingly shorter and more depressed. Length, about 4–5 mm.; anterior wing, 2.8–3.3 mm.

Holotype male, allotype and one paratype, a male, from ONE AND ONE-HALF MILES SOUTH OF ADELANTO, SAN BERNARDINO COUNTY, CALIFORNIA, on *Nama demissum* var. *deserti,* April 25, 1937 (Timberlake). Also the following paratypes: SAN BERNARDINO COUNTY: 1 male, 2 females, Morong Valley, on *Nama,* April 19, 1937; 1 female, seven miles north of Llano, on *Nama,* May 7, 1937; 6 males, Apple Valley, on *Nama,* May 9, 1958 (Timberlake); 16 males, 2 females, Kramer Hills, on *Nama,* May 1, 1953 (Hurd, Marsh and Schuster); 1 male, 2 females, Kramer Hills, April 26, 1957 (Stage and Powell); 1 female, Morongo Valley (G. I. Stage). RIVERSIDE COUNTY: 5 females, Palm Springs, four on *Nama,* one on *Oenothera,* March 21–26, 1932; 3 females, 7.5 miles south of Twentynine Palms, on *Nama,* May 7, 1948 (Timberlake). INYO COUNTY: 2 males, 4 females, Cartago, on *Phacelia* sp. near *fremonti,* May 2, 1927 (Timberlake).

CONANTHALICTUS MACROPS Cockerell

The type locality of *macrops* is Claremont, California. It has been taken in some numbers also at Tetley Park, San Bernardino Mountains, on *Phacelia davidsonii,* May 15, 1937 (Timberlake), and at Swartout Valley, San Gabriel Mountains, on the same

flower, June 3, 1928.

Conanthalictus cockerelli Timberlake, new species

The male of this species and of *macrops* are similar and both differ from *mentzeliae* in the smaller size, much shorter antennae and dull mesonotum. The difference between this species and *macrops* in both sexes is brought out in the table.

Male.—Head and thorax dark green, the clypeus black. Mandibles black at base, testaceous in middle and red at apex. Labrum dark rufotestaceous. Abdomen blackish with the apical depression of tergites brownish testaceous. Antennae and legs blackish. Tegulae pale testaceous. Wings somewhat dusky hyaline, the nervures brown, with the subcosta and margins of stigma fuscous.

Head large, somewhat broader than long and broader than thorax, the cheeks broad, inner orbits moderately diverging in front. Antennae slender, with pedicel and first six joints of flagellum longer than thick, except the second which is as thick as long. Mandibles with a broad and obliquely truncate inner tooth, which is separated from the slender apical tooth by a deep emargination. Apical half of segment 6 of venter with a broad convex median part, and with the outer fourth on each side deeply pitted. Segment 5 with a small rounded subapical prominence on each side, covered with fine short pubescence. Head and thorax finely tessellate and dull, without distinct punctures except on the clypeus and mesopleura, the base of propodeum more granular than other parts and opaque. Abdomen microscopically shagreened and dull. Pubescence white, erect and moderately abundant on head and thorax, and the apical fimbria of abdomen brown. Segment 2 of venter with a sparse, very fine and short pubescence, and at outer corners of two following segments is a tuft of long white hair. Length, 3–5.5 mm.; anterior wing, 3.8 mm.

Female.—Head and thorax dark green, the clypeus, posterior half of mesoscutum and the scutellum black. Abdomen dull ferruginous red, with the lateral and basal margins of tergite 1 blackish, and the lateral foveae of tergite 2 black. Mandibles piceous, becoming rufotestaceous at middle. Antennae and legs blackish, with the flagellum of antennae reddish-brown beneath. Tegulae and wings as in male.

Head distinctly broader than long and somewhat broader than thorax, with the inner orbits moderately diverging in front. Head and thorax minutely tessellate and dull, with the basal area of propodeum more granular and opaque; frons, vertex and mesonotum with sparse, minute and indistinct setiferous punctures. Abdomen microscopically tessellate and dullish. Pubescence white, erect and moderately abundant on head and thorax, with the hair on frons and disk of mesonotum rather short. Apical fimbria of abdomen dense and brown, and the scopal hair on outer side of hind tibiae and basitarsi tinged with brown. First three segments of venter with rather dense erect hair, long on the first two segments, and serving as a supplementary scopa. Length 5–5.5 mm.; anterior wing, 3.3–3.5 mm.

Holotype male, allotype and five paratypes (1 male, 4 females) from ELEVEN MILES SOUTHWEST OF VICTORVILLE, SAN BERNARDINO

County, California, on *Phacelia fremonti*, April 25, 1937 (Timberlake).

Conanthaictus mentzeliae Timberlake, new species

This species is the largest in a group of five species that have the head of the male distinctly broader than long and the mandibles with a slender apical tooth and a broadly truncate inner tooth. Three of the females belonging here, including *mentzeliae*, have a red abdomen, but it is black in *seminiger* and *nigricans*. *C. mentzeliae* is most similar to *macrops*, but is considerably larger and the antennae of the male are unusually long and clavate.

Male.—Head and thorax dark blue-green, the abdomen black, with the apical depression of tergites brownish. Mandibles black at base, testaceous in middle and red at apex. Antennae black, the flagellum a little brownish beneath. Legs black, the tibial spurs testaceous and the claws rufotestaceous. Tegulae pale amber color. Wings faintly dusky hyaline, the nervures brown, with subcosta and margins of stigma fuscous.

Head large, broader than long and broader than thorax, with the cheeks and temples broad but receding and the inner orbits divergent in front. Mandibles strongly curved, with a broad evenly truncate inner tooth and a long slender incurved apical tooth. Antennae slenderly clavate, reaching middle of mesoscutum, with the scape long and slender, the pedicel and six following joints much longer than thick and the five apical joints gradually thickened. Segments 3 to 5 of venter somewhat biarcuately margined at apex and somewhat produced in middle, the fifth with short dense hair on a low, transverse, preapical elevation on each side. Segment 6 with the middle third of the width produced into a rounded lobe, which is about one-half as long as wide, and with a deep pit on each side, the middle of the posterior margin of the pits armed with one spine. Head and thorax minutely tessellate and dullish, the mesoscutum sometimes, but not always, much more delicately tessellate and more shining than other parts ,and the basal area of propodeum minutely granular and opaque. Puncturation very minute and indistinct except on the clypeus and mesopleura. Abdomen microscopically shagreened and dull, and the apical tergites minutely punctured. Pubescence whitish, long, thin and erect, but becoming somewhat denser and more plumose on sides of face opposite the antennae, and on the scapes; a narrow band of thin white hair across the apical depression of tergites 2 to 3, but broadly interrupted in middle, and a similar but brown fringe across apex of tergites 4 and 5; the apical fimbria of tergite 6 long, dense, plumose and brownish fuscous. Length, 6.5 mm.; anterior wing, 4.3–4.5 mm.

Female.—Head and thorax dark blue-green, the labrum, clypeus, supraclypeal area, disk of mesoscutum and the scutellum black. Abdomen ferruginous, the pygidial plate black. Antennae blackish, with the flagellum reddish brown at apex and beneath. Mandibles rufotestaceous, more reddish at apex and narrowly black at base. Legs blackish, the spurs testaceous. Tegulae pale testaceous. Wings dusky hyaline, the nervures brown, with the

subcosta and outer margin of stigma fuscous.

Head about as broad as long and somewhat broader than thorax, with the inner orbits rather distinctly but only slightly diverging in front. Mandibles stout, with a blunt inner tooth. Antennae subclavate, hardly reaching beyond the occiput, the pedicel much thicker and longer than the next two joints but not equalling their combined length. Pygidial plate subtriangular, a little longer than wide and rounded at apex. Head and thorax finely tessellate and dullish, with the disk of mesoscutum and the scutellum smoother and more shining, and the basal area of propodeum duller than other parts; frons, vertex, mesonotum and mesopleura with very fine but distinct and well-separated punctures. Pubescence sparse, fine and white, becoming a little denser and more plumose on sides of face opposite antennae; a thin band of white hair on each side of the apex on tergites 2 and 3, and the gradulus at base of tergites 3 and 4 with a fringe of very short hair; apical fimbria a pale brown. Segments 1 and 2 of venter with rather long and dense erect hair, which serves as a supplementary scopa. Length, 6.5–7 mm.; anterior wing, 4.3 mm.

Holotype male, allotype and five paratypes (males) from KRAMER HILLS, SAN BERNARDINO COUNTY, CALIFORNIA, on *Mentzelia*, April 26, 1957 (Paul D. Hurd, Jr.); 1 male, 1 female (paratypes) Kramer Hills, April 26, 1957 (Powell and Stage); 1 male (paratype), Kramer Hills, on *Malacothrix*, May 2, 1953 (Hurd); 1 male (paratype), Kramer Junction, April 27, 1949 (Linsley, Ray Smith and MacSwain); 1 female (paratype), 7.5 miles south of Twentynine Palms, Riverside County on *Mentzelia albicaulis*, May 7, 1948 (Timberlake).

The following material from Inyo County belongs with *mentzeliae* but is not typical, as the tessellation of the mesonotum is much stronger: 2 females, 2 males, Mazourka Canyon, 6000 feet, Inyo Mountains, the males and one female on *Phacelia*, the other female on *Mentzelia affinis*, May 23, 1937 (C. D. Michener).

Subgenus CONANTHALICTUS Cockerell

CONANTHALICTUS CONANTHI (Cockerell)

On the mesa about three miles east of the agricultural college at Mesilla Park, New Mexico, on September 19, 1957, I found only one plant of *Nama hispidum* and from its flowers I was able to capture four females of *C. conanthi* (Cockerell). Also one female of *conanthi* has been taken 2.5 miles north of Rodeo, Hidalgo County, New Mexico, September 7, 1959 (D. D. Linsdale).

CONANTHALICTUS COTULLENSIS Crawford

Of this species I have examined only one male, probably one of the original type series, and taken at Cotulla, Texas, in 1906 by Crawford.

Subgenus SPHECODOSOMA Crawford

Sphecodosoma differs from the other groups of *Conanthalictus* in having a much longer proboscis, with very long maxillary palpi.

CONANTHALICTUS PRATTI (Crawford)

Material examined as follows from Texas: 1 pair, Cotulla, Lasalle County, the female labeled a cotype; 1 male, 12 miles north of Mason, Mason County, on *Lesquerella*, April 13, 1952 (C. D. Michener); 13 females, 20 males, San Ygnacio, Zapata County, April 15, 1952 (Michener and the Beamers); 2 males, five miles east of Riogrande, Starr County, April 10, 1950 (the Beamers, Stephen, Michener and the Rozens).

The material recorded above exhibits considerable variation, but the basal area of the propodeum is always finely rugose almost to the apex, with the apical margin usually a little raised and dullish. Several specimens have only two submarginal cells on either one or both wings, and either the first or second intercubitus may be wanting. Females vary in the shape of the head, which is usually rather distinctly longer than wide, but in some specimens the head is nearly as wide as long. The mesonotum is often somewhat dullish, especially on each side or on the posterior border of the scutum, where an extremely fine puncturation becomes sparser towards the median line. Sometimes, however, the mesonotum is more shining, with more or less sparse and unequal punctures, and the very fine puncturation becomes obscure or obsolescent.

Conanthalictus dicksoni Timberlake, new species

This new species is similar to *pratti* and possibly may prove to be a subsptcies| It is slightly larger, with a broader head; the head and thorax are polished, with minute sparse punctures on the mesoscutum, and the basal area of propodeum is minutely roughened only on the basal half, with a very broad shining area on each side and a narrower shining space across the apex. The antennae of the male also are more elongate.

Female.—Head and thorax black, the abdomen dark red, with base of tergite 1 often infuscated and a large round black spot on lateral margins of tergite 2. Mandibles reddish at apex. Antennae black, the flagellum reddish brown toward apex and also beneath except on one or two joints at base. Legs black, the base of hind tibiae slightly reddened and the spurs rufotestaceous. Tegulae blackish at base and testaceous on outer margin.

Wings subhyaline, the nervures brown, the subcosta and outer margins of stigma fuscous.

Head slightly longer than wide and no wider than thorax, the inner orbits parallel. Galeae of proboscis, when folded in repose, reaching halfway to the base and the maxillary palpi well beyond the base of stipites. Proboscidial fossa much wider in front than posteriorly. Mandibles tapering, acute and with a minute inner tooth. Antennae very short and strongly clavate, the joints of flagellum except the first and last broader than long, with joints 2 to 4 very short and discoid. Second submarginal cell usually about twice as high as long, with nearly parallel sides and the first recurrent nervure received near its apex; second intercubitus sometimes partly obsolete and entirely absent on one wing of one specimen. Hind tibiae strongly widened from the base toward apex, the scopal hair on outer surface long, moderately thin, depressed and fringing the hind margin where it is supplemented by plumose hair on the inner surface. Head and thorax polished, with minute and widely separated punctures on the frons and mesonotum, but the flanks of propodeum minutely shagreened and slightly dullish. Basal area of propodeum shallowly depressed toward base and minutely roughened on basal half, but the apical border and a broad area on each side polished. Abdomen shining, with a minute and moderately close puncturation. Pubescence short, appressed and white, most abundant around the base of the antennae and on posterior margin of pronotum and the tubercles. Hair of apical tergites long and rather thin, but more or less obscuring the short, dense brownish or fuscous fimbria on apex of tergite 5. Hair across the apical part of ventral segments moderately short and rather dense, becoming more erect on basal segments. Middle tibiae armed with short, stiff and more or less hooked setae on anterior margin of the apical half. Length, about 4.5 mm.; anterior wing, 2.9 mm.

Male.—Head, thorax, abdomen and legs black, with apex of abdomen ferruginous. Antennae black at base, the flagellum blackish above and broadly yellowish-brown beneath. Tegulae and wings as in female.

Head about one and one-fourth times longer than wide, the inner orbits slightly converging in front. Antennae long and cylindrical, the joints of flagellum about twice as long as thick and slightly nodose; pedicel as long as thick and shorter than the following joint. Legs more slender than in female. Sixth ventral segment of abdomen with a small medioapical impression, which is set off by a blunt, carinate tubercle on each side and by a more slender preapical median tubercle. Sculpture much as in female, the basal area of propodeum minutely rugose and dull except for a broad apical rim. Pubescence similar, but anterior half of face with rather dense white hair and apex of abdomen without a dark fimbria. Length, about 4 mm.; anterior wing, 2.7 mm.

Holotype female and allotype, EIGHTEEN MILES WEST OF BLYTHE, RIVERSIDE COUNTY, CALIFORNIA, on *Nama hispidum*, April 29, 1952 (Timberlake). Paratypes as follows: 4 females, 6 males taken with the types; 1 female, April 15, and 5 females, 2 males, April 17, 1958, at the same flower and place (Timber-

lake); 1 female, 2 males, same locality, the female on *Coldenia*, April 29, 1952 (P. D. Hurd, Jr. and J. G. Rozen); 4 females, five miles north of Palo Verde, on the same *Nama*, April 19, 1949 (R. C. Dickson).

One female, Davis Mountains, Texas, April 17, 1954 (R. H. Beamer) is certainly conspecific, as well as one female from nine miles south of San Juan del Rio, Durango, Mexico, August 21, 1960 (Arnaud, Ross and Rentz).

ZOOLOGICAL NOMENCLATURE: NOTICE OF PROPOSED USE OF PLENARY POWERS IN CERTAIN CASES (A.[N.S.]47)

In accordance with a decision of the 13th International Congress of Zoology, 1948, public notice is hereby given of the possible use by the International Commission on Zoological Nomenclature of its plenary powers in connection with the following cases, full details of which will be found in *Bulletin of Zoological Nomenclature*, Vol. 18, Part 2 to be published on 14 April 1961.

(1) Validation of the generic name *Enhydrus* Castelnau, 1834 (Insecta, Coleoptera). Z.N.(S.) 398.

(3) Suppression of the generic name *Doralis* Leach, 1827 (Insecta, Hemiptera). Z.N.(S.) 583.

(6) Designation of a type-species for *Nemoura* Latreille, 1796 (Insecta, Plecoptera). Z.N.(S.) 1452.

(7) Validation of the generic name *Silo* Curtis, 1833 (Insecta, Trichoptera). Z.N.(S.) 1455.

Any zoologist who wishes to comment on any of the above cases should do so in writing, and in duplicate, as soon as possible, and in any case before 14 October 1961. Each comment should bear the reference number of the case in question. Comment received early enough will be published in the *Bulletin of Zoological Nomenclature*. Those received too late for publication will, if received before 14 October 1961, be brought to the attention of the Commission at the time of commencement of voting.

All communications on the above subject should be addressed as follows: The Secretary, International Commission on Zoological Nomenclature, c/o British Museum (Natural History), Cromwell Road, London, S.W. 7, England.—W. E. CHINA, *Assistant Secretary, International Commission on Zoological Nomenclature.*

A NEW SPECIES OF LORICASTER FROM CALIFORNIA

(Coleoptera: Clambidae)

ALBERT A. GRIGARICK AND ROBERT O. SCHUSTER[1]

University of California, Davis

Clambus and *Loricaster* are now the only two genera in the dascylloid family Clambidae. Two other genera, *Calyptomerus* and *Empelus*, are still considered as clambids by one American author (Hatch, 1957), whereas they are referred to the Calyptomeridae and Anistomidae respectively by Crowson (1955).

The following points should be mentioned for the benefit of coleopterists wishing to work with North American Clambidae. The genus *Loricaster* is apterous and therefore will not key to family in those keys employing the length of wing setae as a character. The occurrence of dilated posterior coxae is polyphyletic and should not be used as a basis for distinguishing clambids. All of the species of *Clambus* have 10, not nine, segments in the antennae. Apparently the scape has passed unnoticed by American authors.

The distinguishing features of the genus *Loricaster* are as follows: antenna of eight segments; antennal club of two segments, with three sensory pits in the distal segment and one in the penultimate; antenna inserted close to eye, with antennal groove adjacent to inner eye margin. Scutellum vestigal. Arcuate mesosternal carina lacking (present in *Clambus*). Metacoxae approximate but not strictly contiguous. Aedeagus with lateral parameres and asymmetric median lobe. Female with paired styli (fig. 5) and a pear-shaped spermatheca.

Loricaster rotundus Grigarick and Schuster, new species

The California species may be distinguished from the closely related species *testaceus* Muls. et Rey on the basis of the aedeagus, particularly the setation of the parameres which, in *testaceus*, terminate in two large lamellate setae and by the presence of a spine on the metatarus.

Male.—Brown or red-brown; setae slightly longer than the distance between the insertions, moderately abundant. Head 270μ long $\times$ 405μ wide. Eyes of six large facets. Eight antennal segments of size and shape as illustrated (figs. 1, 2); antennal insertions 270μ apart, on line with the most anterior eye facets. Pronotum 249μ long $\times$ 538μ wide. Alate. Scutellum minute. Elytra 672μ long, completely covering tergites. Procoxal cavities closed behind; profemur with sensory pit on dorsal surface at distal four-fifths; two pairs of lamellate setae on the first tarsal segment and one pair

on the second; tarsal claws equal, simple. Mesosternum medianly carinate; mesofemur expanded (fig. 4). Metasternum impressed behind mesocoxae, medianly carinate at posterior third. Metacoxa as in figure 7; first metatarsus with two short thick setae at middle and large distal spur. Abdomen with six transverse, membranous segments and a sclerotized, conical ultimate tergite. Aedeagus 225μ long (fig. 6).

Female externally resembles the male.

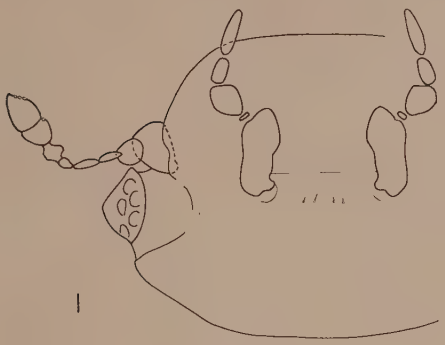
Holotype male and one paratype were collected FOUR MILES NORTH OF RUMSEY, YOLO COUNTY, CALIFORNIA, June 3, 1960, by R. O. Schuster. The type, a whole-mount, cleared and stained with acid fuchsin and mounted in piccolite, is deposited in the California Academy of Sciences. Other specimens from California comprise the paratypic series as follows: Contra Costa County: Canyon Nook, Mt. Diablo St. Park, 1♂, 1♀ VII-10-58 (R. O. Schuster, L. M. Smith); Mt. Diablo, 2♀ II-23-53 (G. A. Marsh, R. O. Schuster), 4♂, 3♀ V-26-59 (R. O. Schuster, L. M. Smith). Kern County: 10 miles west Isabella Reservoir, 1♂ V-12-59 (L. M. Smith); two miles west Isabella Reservoir, 2♂, 1♀ III-31-59 (F. C. Raney); 30 miles east Bakersfield, 2♂ V-12-59 (L. M. Smith). Los Angeles County: Pasadena, eight point-mounted specimens (A. Fenyes). Napa County; three miles west Oakville, 1♂ I-3-58 (F. C. Raney, R. O. Schuster). San Diego County: Hell Hole Canyon, Borrego Springs, 1♂, 6♀ III-25-59 (A. A. Grigarick, L. M. Smith); Borrego State Park, 1♂, seven point-mounted specimens IV-25-55 (R. O. Schuster, collection from Palm Canyon groves of *Washingtonia filifera*. Permit issued by the State to the California Insect Survey). Tulare County: one mile east Lemon Cove, 1♂, 2♀ V-13-59 (L. M. Smith). Yolo County: six miles north Rumsey, 1♂ II-9-60 (R. O. Schuster, L. M. Smith); 5.4 miles southwest Winters, 1♂ V-29-59 (F. C. Raney, R. O. Schuster, L. M. Smith).

A small amount of variation occurs in the setae of the gular region and in lengths of setae of the female genital styli but these variations do not appear to represent species differences.

The head is declivous in life. The recognizable structures found in gut contents are various types of spores and this species probably feeds on fungi and decaying vegetation as do other clambids.

EXPLANATION OF FIGURES

Fig. 1, ventral surface of head; fig. 2, antennal club; fig. 3, shape of pronotum; fig. 4, mesofemur; fig. 5, female genital stylus; fig. 6, aedeagus; fig. 7, metathoracic leg.



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It occurs in montane situations below 3,000 feet in Southern California, in the Coast Range, and in the Sierra.

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ATTRACTION OF PLEOCOMA DUBITALIS DUBITALIS DAVIS TO BLACK LIGHT

(Coleoptera: Scarabaeidae)

Jean Fisher

Salem, Oregon

Males of the common rain beetle, *Pleocoma dubitalis dubitalis* Davis, have been taken in numbers during the fall rainy season of the past two years by means of a black light trap. This trap, loaned by the Oregon State Department of Agriculture, was run as part of a routine check for new insect pests, near Salem, Oregon.

Males of *P. dubitalis* emerge during the fall to mate with the earth dwelling females and are in flight during October and November (Ritcher and Beer, 1956). Fifty males were taken from the black light trap during October and November of 1959 and 133 during the same months of 1960. Of those collected in 1960, 125 were taken between October 16 and November 20.

The trap was placed on the ground in a marginal farming area at an elevation of 350 feet, seven miles west of Salem, Oregon, in Polk County. This electrical light trap is a model designed by the Gardiner Manufacturing Company of Horicon, Wisconsin, and employs a 15-watt fluorescent black light tube. It was plugged into a 110v AC line.

Breeding grounds for the beetles are thought to be nearby within a small 50-year-old stand of Douglas fir, white fir, and oak. Typical undergrowth there consists of blackberries, poison oak, snowberry, madrone, maple, and scotch broom.

Literature Cited

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A RECLASSIFICATION OF THE DESCRIBED MEXICAN AND CENTRAL AMERICAN SPHAERIONINE CERAMBYCIDAE

(Coleoptera)

E. GORTON LINSLEY[1]

University of California, Berkeley

The wide discrepancies in the application of the older generic names for sphaerionine Cerambycidae by Thomson (1860, 1864), Lacordaire (1869), Bates (1880, 1885), and Aurivillius (1912) has made the identification of Mexican and Central American species difficult, although Gounelle (1907) has done much to clarify the application of these names to the South American fauna. The following notes are intended merely to provide a workable classification for the previously described species, principally those treated by Bates in the Biologia Centrali-Americana (1880, 1885) and his supplement thereto (1892). No attempt has been made to integrate the various undescribed species which exist in collections, although these have been taken into account, where feasible, in testing the validity of generic concepts.

The tribe Sphaerionini is not clearly separated from the Elaphidionini. Its use here is one of convenience. The genera included, with the exception of *Axestinus*, all have the antennae or posterior tibiae carinate, usually both, and spines at the apex of one or more antennal segments beginning with the third.

KEY TO THE GENERA OF DESCRIBED MEXICAN AND CENTRAL AMERICAN SPHAERIONINI

1. Intermediate and posterior femora pedunculate and clavate at or beyond the middle 2
– Intermediate and posterior femora gradually enlarged or linear 13
2(1). Elytra subglabrous or thinly clothed with suberect hairs, or with patches of condensed appressed pubescence 3
– Elytra uniformly densely clothed with very fine, silky pubescence, antennal spines of female short, of male very feeble; femora without apical spines; intermediate coxal cavities

[1] This study is one of a number made possible by the National Science Foundation during the author's tenure as Research Professor, Miller Institute, University of California. Types of described species were kindly made available at the American Museum of Natural History, New York, by J. G. Rozen, at the British Museum (Natural History), London, by E. B. Britton, at the Museum of Comparative Zoology, Harvard University, by P. J. Darlington, at the Museum National d'Histoire Naturelle, Paris, by A. Villiers, at the United States National Museum, Washington, D.C., by J. F. G. Clarke and G. Vogt, at the Naturhistoriska Riksmuseet, Stockholm, by E. Kjellander, and at the Universitets Zoologiske Museum, Copenhagen, by S. L. Tuxen.

open to epimera (type: *Sphaerion cyanipenne* Serville) .... *Sphaerion*

3(2). Pronotum and elytra polished, shining, subglabrous or thinly clothed with erect or suberect hairs 4

– Pronotum with condensed patches of pubescence or tomentose areas or the surface densely alveolate-punctate 9

4(3) Pronotum without a lateral tubercle 5

– Pronotum with an obtuse lateral tubercle; intermediate coxal cavities open to epimera; posterior femora bispinose or bidentate at apex (type: *Stizocera floridana* Linsley).... *Nesostizocera*

5(4). Antennae with apical spines on segments three to five or more; elytral apices with an external spine 6

– Antennae with a long spine on third segment, remaining segments unarmed; elytral apices not, or scarcely emarginate, without an external spine (type: *Psyrassa pilosella* Bates) *Micropsyrassa*

6(5). Posterior femora unarmed or at most bidentate at apex 7

– Posterior femora spinose at apex; intermediate coxal cavities closed to epimera (type: *Stizocera armata* Serville) ....*Stizocera*

7(6). Intermediate coxal cavities open to epimera; spine of third antennal segment not more than twice as long as that of fourth segment 8

– Intermediate coxal cavities closed to epimera; spine of third antennal segment more than twice as long as that of fourth segment (type: *Periboeum villosulum* Bates) ....*Neoperiboeum*

8(7). Antennal segments three to five spinose at apex, spines of third and fourth segments disproportionately long; pronotum distinctly punctate (type: *Periboeum cribricolle* Bates) .... *Hemistizocera*

– Antennal segments three to seven spinose in the male, three to eight in the female, the spines gradually decreasing in size; pronotum smooth and almost impuncate (type: *Nephalius rutilus* Bates) ....*Nephaliodes*

9(3). Pronotum densely alveolate-punctate 10

– Prontum not alveolate-punctate 11

10(9). Antennae with segments three to seven spinose at apex; elytra immaculate (type: *Conosphaerion concolor* Linsley).... *Conosphaerion*

– Antennae at most with segments three to five spinose at apex, spines of fourth and fifth segments minute or lacking in the male; elytra each with an oval integumental spot (type: *Periboeum bimaculatum* Bates) ....*Haplosphaerion*

11(9). Pronotum irregularly sculptured with dorsal callouses; elytra with irregular patches of dense white pubescence, without pale integumental spots 12

– Pronotum minutely punctate and tomentose at least marginally, without irregular dorsal callouses; elytra with pale integu-

mental spots; third to eighth antennal segments spinose at apex, gradually decreasing in length (type: *Sphaerionillum quadrisignatum* Bates) ..... *Sphaerionillum*

12(11). Antennae with spines at apex of segments three to five, at least; elytral apices emarginate, outer angle dentiform or spiniform (type: *Trichophorus albisparsus* Bates) ..... *Eutrichophoroides*

– Antennae with a short spine at apex of third segment, fourth segment unarmed or minutely dentate or spiculate; elytral apices sinuate-truncate (type: *Trichophoroides niveus* Linsley) ..... *Trichophoroides*

13(1). Pronotum unarmed or with an acute lateral tubercle or process 14

– Pronotum broadly angulate with an obtuse lateral tubercle; elytra minutely pubescent (type: *Nephalius amictus* Newman) ..... *Nephalius*

14(13). Pronotum polished, glabrous, sparsely punctate 15

– Pronotum densely punctate or pubescent, or punctate with smooth spaces or polished dorsal callosities 21

15(14). Pronotum without prominent elevated callosities; femora bidentate or unarmed at apex 16

– Pronotum with prominent elevated dorsal callosities; intermediate and posterior femora linear, armed with a prominent apical spine (type: *Sphaerion erichsonii* White) ..... *Pantonyssus*

16(15). Pronotum without a lateral tubercle 17

– Pronotum armed with a lateral tubercle; antennal segments three to seven spinose at apex in the male, three to ten in the female; elytral apices emarginate, with an external spine (type: *Nephalius suturalis* Pascoe) ..... *Parastizocera*

17(16). Pronotum subcylindrical: eyes coarsely or moderately coarsely faceted; prosternum with intercoxal process arcuate posteriorly 18

– Pronotum depressed, wedge-shaped or broadly rounded at the sides; eyes finely faceted; prosternum with intercoxal process abruptly declivous posteriorly (type: *Callidium notatum* Olivier) ..... *Stenosphenus*

18(17). Episterna of metasternum not covered by elytra 19

– Episterna of metasternum very narrow, covered by elytra, except toward base; spines of third and fourth antennal segments stout and recurved, that of third segment not disproportionately larger than that of fourth segment (type: *Nephalius xestioides* Bates) ..... *Megapsyrassa*

19(18). Antennal spines gradually decreasing in length, that of third segment but little longer than that of fourth segment; eyes finely to moderately coarsely faceted; elytra sometimes densely pubescent 20

– Antennal spine of third segment disproportionately long, usually

at least twice as long as that of fourth segment; eyes coarsely faceted; elytra never densely pubescent (type: *Psyrassa basicornis* Pascoe) ..... *Psyrassa*

20(19). Eyes very finely faceted; intermediate coxal cavities closed to epimeron (type: *Stenosphenopsis nitidicollis* Linsley) ..... *Stenosphenopsis*

– Eyes moderately coarsely faceted; intermediate coxal cavities open to epimeron (type: *Ironeus duplex* Bates) ..... *Ironeus*

21(14). Pronotum with a lateral tubercle 22

– Pronotum without a lateral tubercle 24

22(21). Elytra sparsely clothed with erect and suberect hairs; prostrate hairs, if present, not obscuring surface 23

– Elytra densely clothed with golden and brown tomentum which completely obscures the surfaces (type: *Mallocera glauca* Serville) ..... *Mallocera*

23(22). Pronotum with a prominent lateral tubercle which is usually acute or subacute; elytra with pale integumental maculations, usually subcostate, apices bispinose (type: *Mallocera lacordairei* Lacordaire) ..... *Paramallocera*

– Pronotum with a feeble lateral tubercle; elytra concolorous, without integumental maculations, smooth, apices emarginate but not spinose (type: *Pseudoperiboeum subarmatum* Linsley) ..... *Pseudoperiboeum*

24(21). Pronotum and elytra without patches of condensed prostrate white pubescence 25

– Pronotum and elytra with scattered patches of condensed prostrate white pubescence; (type: *Trichophorus decipiens* Bates) ..... *Neotrichophoroides*

25(24). Antennal segments with prominent spines at apex of one or more segments beginning with third, some of the segments usually distinctly carinate 26

– Antennae serrated, without distinct spines and without distinct carinae, twelve-segmented in the male, eleven-segmented in the female; elytra apices bispinose in the male, unarmed in the female; large species, 27 mm. or more in length (type: *Axestinus obscurus* LeConte) ..... *Axestinus*

26(25). Antennae with segments beginning with fourth or fifth flattened and usually expanded externally, beginning with fourth, fifth or sixth, obtusely carinate, the carinae distinct over apical segments including last; elytral apices nearly always prominently bispinose or trispinose; larger species, usual range 20–36 mm. 27

– Antennae slender, at most with outer segments slightly expanded, carinae fine, usually beginning with third segment and rarely extending beyond seventh or eighth segments; elytral apices truncate or shallowly emarginate, sometimes armed with a sutural spine, sometimes bispinose; smaller species, usual range 9–20 mm. 29

27(26). Elytra pubescent, the pubescence sometimes interrupted by denuded lines or small round dots 28

– Elytra polished, shining, glabrous except for scattered erect setae; antennae a little longer than the body in the male, shorter than the body in the female, third and fourth segments sulcate, third to seventh spinose, eleventh appendiculate (type: *Aneflus? fulvipennis* Bates..... *Meganeflus*

28(27). Antennae twelve-segmented in the male (type: *Protaneflus pubescens* Linsley)..... *Aneflus (Protaneflus)*

Antennae eleven-segmented in both sexes (type: *Elaphidion protensum* LeConte) ..... *Aneflus (Aneflus)*

29(26). Antennae with spine of third segment usually straight, acute, but little longer than that of fourth segment, when present; body sparsely clothed with long flying hairs (type: *Elaphidion subpubescens* LeConte) ..... *Aneflomorpha*

– Antennae with spine of third segment very long, incurved, blunt; body abundantly clothed with long flying hairs (type: *Elaphidion tenue* LeConte)..... *Anepsyra*

Genus SPHAERION Serville

Sphaerion Serville, 1834, Ann. Soc. Ent. France, 3:68; Gounelle, 1907, Bull. Soc. Ent. France, 1907:240.

This genus may be readily recognized among the Mexican and Central American Sphaerionini with clavate and pedunculate femora by having the elytra uniformly densely clothed with very fine silky pubescence. It differs from *Nephalius* by the unarmed pronotum. The species are principally South American although the following extends its range into southern Mexico.

SPHAERION EXUTUM (Newman)

Nephalius exutus Newman, 1841, Entomologist, 1:93.
Sphaerion exutum, Gounelle, 1907, Bull. Soc. Ent. France, 1907:240.

Male: Form elongate, subparallel, depressed; integument reddish-brown, densely clothed with pale silky pubescence which hides the surface except for the coarser punctures, and scattered, coarse, suberect hairs on the legs and elytra. Head with eyes coarsely faceted; antennae exceeding elytral apices by about three segments, third and fourth segments bicarinate, fourth and fifth unicarinate, third and fourth segments feebly spinose at apex. Pronotum wider than long, sides broadly rounded, apex wider than base which is moderately constricted, disk with an elongate-oval median callous and a pair of suboval callouses on each side, the anterior a little larger, sides coarsely punctate, the punctures visible through the pubscence and mostly separated by about two diameters; pro-sternum with pubescence and punctation similar to that of side of pronotum; meso- and metasterna densely pubescent, without coarse punctures. Elytra with the larger punctures less coarse than those of pronotum and a little more widely separated, becoming smaller and less evident over apical one-third, where the long, coarse, erect setae are more numerous; apices rounded externally and internally to a

median apical spine. Legs with femora pedunculate and suddenly clavate beyond middle, apices without spines; tibiae carinate. Abdomen densely pubescent, with a very few, widely separated, coarse punctures bearing a suberect hair. Length 14–16 mm.

Characterized from two males captured seven miles west of Tuxtla Gutierrez, Chiapas, Mexico, April 2, 1953 (R. C. Bechtel and E. I. Schlinger) (California Insect Survey, University of California, Berkeley). These examples are 14–16 mm. in length, in the lower size range of Brazilian examples.

Nesostizocera Linsley, new genus

Integument polished, shining, sparsely punctate, subglabrous except for scattered long erect hairs. Head with eyes coarsely faceted, antennae exceeding elytral apices in the male, segments carinate, three to six, seven or eight spinose at apex. Pronotum, with disk uneven and more or less tuberculate, almost impunctate, constricted at base and apex, sides with an obtuse lateral tubercle; prosternum with intercoxal process arched and arcuately declivous posteriorly; intermediate coxal cavities open to epimeron; episterna of metathorax narrow, parallel-sided. Elytra with apices emarginate, the angles acute or subspiniform. Legs slender, posterior femora pedunculate and clavate beyond middle, apex acutely bidentate or more or less bispinose; intermediate and posterior tibiae carinate.

Type of Genus: *Stizocera floridana* Linsley

This genus is proposed for a group of species, principally from the West Indies and Florida, which have been assigned previously to *Stizocera*. They differ from that group in the laterally tuberculate pronotum, open intermediate coxal cavities, and less strongly developed femoral and elytral spines. In addition to the type, *S. dozieri* Fisher and *S. vanzwaluenburgi* Fisher should be included.

Micropsyrassa Linsley, new genus

Small sized (ca. 7–8 mm.), parallel-sided, slightly depressed. Integument polished, shining, thinly clothed with long erect hairs. Head with eyes coarsely faceted; antennae with a long slender spine at apex of third segment which is slightly curved and more than half as long as fourth segment, spine of fourth segment if present, short, straight carinae scarcely evident beyond fifth segment. Pronotum cylindrical, without a lateral spine or tubercle; prosternum of male transversely impressed, coarsely punctate, finely pubescent in front of coxae, intercoxal process arcuate behind; intermediate coxal cavities closed to epimeron; episterna of mesosternum narrow, subparallel, not covered by elytra. Elytra with apices rounded to the suture or feebly emarginate, not spinose. Femora pedunculate and abruptly clavate, apices without spines, at most feebly dentate; tibiae carinate.

Type of Genus: *Psyrassa pilosella* Bates

This genus is proposed for a number of small species, mostly undescribed, which resemble *Psyrassa* in the long apical spine of

the third antennal segment. They differ at once, however, in the pedunculate and abruptly clavate intermediate and posterior femora and the strongly impressed prosternal sexual characters of the male.

Genus Stizocera Serville

Stizocera Serville, 1834, Ann. Soc. Ent. France, 3:107; Gounelle, 1907, Bull. Soc. Ent. France, 1907:241.

In this genus the femora are pedunculate and clavate and spinose at the apex, the pronotum is cylindrical, polished and subglabrous, the intermediate coxal cavities are closed to the epimeron, and the elytral apices have a prominent external spine. Species known to occur in Central America are *S. plicicollis* Germar, *S. lissonota Bates*, and *S. poeyi* Chevrolat in Panama, and *S. laceyi* Linsley in British Honduras.

Neoperiboeum Linsley, new genus

Medium-sized (ca. 14–20 mm.), elongate, parallel-sided. Integument shining but punctate and thinly pubescent. Head with eyes coarsely faceted; antennae of male exceeding elytral apices by about four segments, carinae distinct over third to fifth segments, faint over outer segments, third to fifth segments spinose at apex, spine of third segment more than twice as long as that of fourth, apex blunt; antennae of female slightly surpassing elytral apices, third to sixth (or seventh) segments spinose at apex, spine of third segment more than half as long as fourth segment, blunt, projecting at a greater angle than spines of following segments. Pronotum cylindrical, without a lateral spine or tubercle, dorsal surface with an elongate longitudinal, post-median callous with an ante-median callous on each side, punctation coarse, confluent, not alveolate; prosternum with intercoxal process arcuate posteriorly; intermediate coxal cavities closed to epimeron. Elytra with apices narrowly emarginate, sutural angle dentiform, external angle armed with a short spine. Femora pedunculate and abruptly clavate, without apical spines; intermediate and posterior tibiae carinate.

Type of Genus: *Periboeum villosulum* Bates

This genus differs at once from *Periboeum* by the unarmed pronotum and closed intermediate coxal cavities. It is more closely related to *Stizocera*, from which it is distinguished by the absence of femoral spines and the more abundant erect pubescence.

Neoperiboeum villosulum (Bates)

Periboeum villosulum Bates, 1872, Trans. Ent. Soc. London, 1872:176; Bates, 1880, Biologia Centrali-Americana, Coleoptera, 5:27, 253, pl. 3, fig. 16.

Dark brown with appendages reddish-brown, surface thinly clothed with long erect pale hairs which do not obscure the integument. Pronotum coarsely and more or less confluently punctate, obscurely clothed with fine appressed pubescence intermixed with long erect, coarse flying hairs; scutellum densely white pubescent. Elytra with basal punctures separated, less

coarse than those of pronotum, becoming finer and sparser behind the middle, evanescent apically; surface thinly clothed with moderately short, coarse, recurved pubescence intermixed with longer erect hairs. Posterior femora nearly attaining elytral apices in male, falling distinctly short of apices in female. Length 14–20 mm.

Specimens have been seen from Nicaragua and Panama. The type locality is Chontales, Nicaragua.

Hemistizocera Linsley, new genus

Form elongate, subcylindrical; integument polished, shining, coarsely and distinctly punctate, thinly clothed with an intermixture of short and moderately long suberect hairs. Head with eyes coarsely faceted; antennae with carinae distinct over third to fifth segments, faint beyond fifth, third to fifth segments armed with an apical spine, that of third segment long, slender, curved, acute at apex, more than half as long as fourth segment, that of fourth segment straight, also long but not reaching middle of fifth segment. Prothorax cylindrical, without a lateral spine or tubercle, pronotum with an irregular, post-median smooth area; prosternum with intercoxal process arched, apex expanded; mesosternum with intermediate coxal cavities open to epimera. Femora pedunculate and clavate, without apical spines; intermediate and posterior tibiae carinate.

Type of Genus: *Periboeum cribricollis* Bates

A genus apparently related to *Stizocera*, but differing by having the intermediate coxal cavities open to the epimera and the femora without apical spines.

Hemistizocera cribricollis (Bates)

Periboeum cribricolle Bates, 1885, Biologia Centrali-Americana, Coleoptera, 5:253, pl. 18, fig. 9.

Stizocera cribricollis, Aurivillius, 1912, Coleopt. Catal., 39:99.

Dark rufo-castaneus. Pronotum with punctures surrounding smooth area contiguous and to some extent confluent. Elytra less coarsely punctate than pronotum, basal punctures mostly separated by less than one diameter, punctures becoming smaller beyond middle and evanescent over apical one-third. Length 15 mm.

The type specimen, apparently a female (?), is from Almolonga, Mexico.

Nephalioides Linsley, new genus

Integument polished, shining, sparsely punctate, subglabrous except for a few long suberect hairs. Head with eyes coarsely faceted; antennae exceeding elytral apices by about four segments in the male, two in the female, with carinae distinct on third and fourth segment, third to seventh segment spinose in the male, third to eighth in the female, the spines straight, successively decreasing in length. Pronotum smooth, almost impunctate, without a lateral spine or tubercle, rounded or obtusely rounded at the sides; prosternum with intercoxal process arcuately declivous posteriorly; intermediate coxal cavities open to epimeron; episterna of metathorax narrow, parallel-sided. Elytra with apices obliquely emarginate, inner angle dentiform, outer

angle spinose. Legs with posterior femora exceeding elytral apices in the male, extending nearly to apices in female, feebly swollen and slightly pedunculate; intermediate and posterior tibiae carinate.

TYPE OF GENUS: *Nephalius rutilus* Bates.

Superficially resembling the genus *Parastizocera*, but the contained species are of a smaller size (11–17 mm.), the pronotum is unarmed, and the intermediate and posterior femora are feebly swollen and slightly pedunculate. The smooth pronotum and more numerous antennal spines distinguish it from *Hemistizocera*.

NEPHALIOIDES RUTILUS (Bates)

Nephalius rutilus Bates, 1872, Trans. Ent. Soc. London, 1872:177; Bates, 1880, Biologia Centrali-Americana, Coleoptera, 5:27, 254, pl. 4, fig. 14.
Stizocera rutilus, Aurivillius, 1912 Coleopt. Catal., 79:99.

Integument black, shining, head and thorax bright red, elytra bluish-black. Length 13–17 mm.

The type, a female, is from Chontales, Nicaragua. Examples from Cordoba, Vera Cruz, Mexico (A. Fenyes, California Acad. Sci.) agree well with the type but are smaller. Specimens from Las Cañas, Costa Rica, April 9, 1943 (T. Aitken, California Acad. Sci.) are darker in color, the head and thorax a darker red, the elytra a darker blue-black.

NEPHALIOIDES NIGRIVENTRIS (Bates)

Nephalius nigriventris Bates, 1874, Trans. Ent. Soc. London, 1874:220; Bates, 1880, Biologia Centrali-Americana, Coleoptera, 5:27, pl. 4, fig. 2.
Stizocera nigriventris, Aurivillius, 1912, Coleopt. Catal., 39:99.

Head, including antennal scape, prothorax, and femora rufo-testaceous antennal flagellum, tibiae, tarsi, and abdomen black, elytra testaceous, sutural margin and apical spines darker. 12–15 mm.

The type, a male, is from Chontales, Nicaragua. The species has also been taken in Guatemala and southern Mexico.

Genus CONOSPHAERION Linsley

Conosphaerion Linsley, 1935, Trans. Amer. Ent. Soc., 61:77.

This genus and the following may be distinguished among the Mexican and Central American Sphaerionini with clavate and pedunculate femora, by the form and sculpturing of the pronotum, which is broadly rounded or obtusely subangulate at the sides and densely alveolate-punctate. Three species are known from central and northern Mexico and southwestern United States. They are all rather small, ranging in length from 10–12 mm.

Haplosphaerion Linsley, new genus

Integument shining but punctate and thinly clothed with long erect hairs. Head with eyes coarsely faceted; antennae, at most with segments three to

five spinose at apex, spines of third and fourth segments minute or lacking in the male. Pronotum elongate, laterally unarmed, the sides obtusely rounded behind the middle, disk without callouses, a smooth vitta behind middle, remaining surface alveolate-punctate, the punctures large but shallow; prosternum with intercoxal process arcuately declivous posteriorly; intermediate coxal cavities closed to epimeron. Elytra with integumental maculae, apices slightly emarginate, inner angle truncate, not produced, outer angle feebly dentiform.

Type of Genus: *Periboeum bimaculatum* Bates

Related to *Conosphaerion*, but differing in the feebly spinose antennae, maculate elytra, and rounded rather than obtusely angulate pronotum.

Haplosphaerion bimaculatum (Bates)

Periboeum bimaculatum Bates, 1872, Trans. Ent. Soc. London, 1872:176; Bates, 1880, Biologia Centrali-Americana, Coleoptera, 5:27, 253, pl. 4, fig. 15.

Integument reddish-brown, elytra each with a somewhat oval, yellowish spot in front of middle, the surrounding area vaguely darker and more brownish, providing greater contrast for the spots. Pronotum with fine, appressed, golden pubescence in basal constriction. Scutellum golden pubescent. Length 9–10 mm.

Type locality: Chontales, Nicaragua.

Genus Trichophoroides Linsley

Trichophoroides Linsley, 1935, Rev. de Entomologia, 5:139.

This genus differs from *Trichophorus* in the feebly spinose antennae, unarmed elytral apices and different type of pubescence. The type species, *T. niveus* Linsley, is from Cuernavaca, Mexico.

Eutrichophoroides Linsley, new genus

Small to moderate-sized, parallel-sided, somewhat depressed. Integument shining, punctation of head and pronotum dense, surface with scattered patches of dense, appressed pubescence, in addition to erect and suberect hairs. Head with eyes coarsely faceted, antennae with third segment much longer than fourth, fourth not or scarcely as long as fifth, spines present on segments three to five or six in the male, three to eight in the female, the ninth sometimes minutely spiculate, carinae distinct on segments three to seven or eight at least. Pronotum about as broad as long, sides broadly rounded, surface with a median polished callous and an arcuate longitudinal callous on each side of disk; prosternal process arcuate posteriorly; intermediate coxal cavities narrowly open externally. Elytra with apices emarginate, outer angle dentiform or spiniform. Femora clavate and pedunculate, apices without spines; intermediate and posterior tibiae carinate.

Type of Genus: *Trichophorus albisparsus* Bates.

A genus apparently related to *Trichophoroides* but differing in the more numerous antennal spines and the form of the elytral apices. In addition to the type species, *Trichophorus jansoni*

Bates should also be assigned here. Both species are from Nicaragua. *E. albisparsus* is a small species, 10–11 mm. in length. *E. jansoni* is larger, ranging from 13–18 mm.

Genus Sphaerionillum Bates

Sphaerionillum Bates, 1885, Biologia Centrali-Americana, Coleoptera, 5:256.

This genus may be readily recognized by the coarse erect setae of the elytra which are more or less equally spaced in four or five rows, the integumental maculations of the elytra, and the minutely punctate and densely tomentose pronotum, at least peripherally. The anterior coxal cavities are closed behind, or nearly so by the expanded apex of the intercoxal process which is arched and arcuately declivous. The intermediate coxal cavities are closed to the epimeron. Two species have been described, *S. quadrisignatum* Bates, and *S. pictum* Bates, differing in the proportions of the pronotum, number and arrangement of the elytral maculations, and the form of the elytral apices.

Genus Nephalius Newman

Nephalius Newman, 1841, Entomologist, 1:93; Bates, 1885, Biologia Centrali-Americana, Coleoptera, 5:254; Gounelle, 1907 Bull. Soc. Ent. France, 1907:243, 244.

This genus was proposed to include five Brazilian species, two of which have since been assigned to *Sphaerion.* The name was used for quite a different group of species by Thomson (1860) and for still another group by Lacordaire (1869). When applied as restricted by Bates (1885) and Gounelle (1907), only one described species from Central America can be assigned here.

Nephalius apicatus Linsley

Nephalius (?) apicatus Linsley, 1935, Rev. de Entomologia, 5:140.

N. apicatus is a yellowish testaceous species with the head and appendages reddish to rufo-piceous and the elytral apices black. The elytra are minutely pubescent, with scattered long, erect setae superimposed. The type series is from La Chorera, Panama (U.S. National Museum).

Genus Pantonyssus Bates

Pantonyssus Bates, 1870, Trans. Ent. Soc. London, 1870:276.

A characteristic genus with linear intermediate and posterior femora which are armed with a single long external spine, and a pronotum with elevated dorsal callosities. The group is represented in Panama by a form which has been referred to *P. bitinctus* Gounelle.

Parastizocera Linsley, new genus

Integument polished, shining, sparsely punctate, glabrous except for a few long suberect hairs. Head with eyes coarsely faceted; antennae twice as long as body in male, third to seventh segments spinose at apex, third to tenth carinate, about as long as body in female, third to fifth segments carinate, third to tenth spinose at apex, spines straight, successively decreasing in length. Pronotum subcylindrical but with a distinct lateral tubercle and five discal tubercles; prosternum with intercoxal process arcuately declivous posteriorly; mesosternal process truncate in front, subvertical; intermediate coxal cavities closed to epimeron; episterna of metathorax narrow, parallel-sided. Elytra with apices obliquely emarginate, inner angle dentiform, outer angle armed with a long spine. Legs with intermediate and posterior femora slender, not clavate or pedunculate, without apical spines; posterior femora attaining elytral apices in male, falling short of apices in female; tibiae carinate.

Type of Genus: *Nephalius suturalis* Pascoe.

This genus is distinguished among the group of genera with a polished subglabrous pronotum and elytra and unarmed, nonpedunculate femora by the presence of a lateral prothoracic tubercle.

Parastizocera suturalis (Pascoe)

Sphaerion suturale Pascoe, 1866, Ann. Mag. Nat. Hist. (3) 18:479.

Nephalius suturalis, Bates, 1880, Biologia Centrali-Americana, Coleoptera, 5:27.

Peribocum suturale, Bates, 1885, Biologia Centrali-Americana, Coleoptera, 5:254.

Stizocera suturalis, Aurivillius, 1912, Coleopt. Catal., 39:99.

Head including antennal scape, thorax, femora except base, and abdomen reddish-brown, antennal flagellum, femora at base, tibiae and tarsi black, elytra yellowish-brown with marginal line and apical spine black. Length 18–22 mm.

Ranging from Brazil to Yucatan, Mexico.

Megapsyrassa Linsley, new genus

Integument polished, shining, sparsely punctate, very thinly pubescent. Pronotum cylindrical, smooth, without a lateral tubercle. Antennae of male not attaining elytral apices, eleventh segment appendiculate, grooves and carinae indistinct, spines of third and fourth segments, coarse, curved, acute, spine of fourth segment a little shorter than that of third, those of fifth and sixth segments straight, successively shorter, that of seventh segment minute. Elytral apices emarginate, inner angle subdentiform, outer angle acute but not spinose. Intermediate and posterior femora gradually enlarged, not clavate or pedunculate, apices not spinose, posterior tibiae carinate. Prosternum with intercoxal process arcuately declivous, apex expanded but not closing coxal cavities. Mesosternum with intercoxal process concave in front; intermediate coxal cavities closed. Metasternum with episterna very narrow, covered by elytra except toward base.

TYPE OF GENUS: *Nephalius xestioides* Bates.

The affinities of this genus are not clear. It should probably be placed next to *Psyrassa*, from which it differs in the extremely narrow metathoracic episterna, the unusually heavy, recurved spines of the third and fourth antennal segments (in *Psyrassa* the spines are nearly always slender and that of the third segment is usually disproportionately long) and the large size of the included species. *Aposphaerion*, to which Bates referred the species in 1880, has clavate femora and bispinose elytral apices.

MEGAPSYRASSA XESTIOIDES (Bates)

Nephalius xestioides Bates, 1872, Trans. Ent. Soc. London, 1872:177.

Aposphaerion xestioides, Bates, 1880, Biologia Centrali-Americana, Coleoptera, 5:28.

Reddish-brown, highly polished, shining. Pronotum very sparsely punctate, with scattered erect pale hairs. Elytra distinctly, moderately coarsely punctate, punctures separated by one to several diameters near base, becoming obsolete beyond middle, with scattered long suberect hairs. Length 26 mm.

The type, a male, is from Chontales, Nicaragua. Examples have also been seen from Costa Rica and Panama.

Genus PSYRASSA Pascoe

Psyrassa Pascoe, 1866, Ann. Mag. Nat. Hist. (3) 18:481; Bates, 1880, Biologia Centrali-Americana, Coleoptera, 5:28; Linsley, 1936, Ann. Ent. Soc. Amer., 29:478.

Including the two following species, *Psyrassa* now comprises about twenty described species in North and Central America. Judging from the description ("thorace lateribus obtuse spinosis, dorso quinque gibboso . . ."), *P. rufescens* Nonfried, described from Brazil, must belong to some other genus.

PSYRASSA SUBPICEA (White), new combination

Sphaerion subpiceum White, 1853, Catal. Coleopt. British Mus. 7:109.

Reddish-brown. Antennae not attaining elytral apices in the male, fourth segment distinctly shorter than third, subequal to fifth, spine of third segment about two-thirds as long as fourth segment, somewhat recurved and at a greater angle to the apex than those of the following segments, the apex acute, spines of fifth to seventh segments distinct, that of eighth segment minute. Pronotum irregularly punctate, with large, shallow, poorly defined punctures. Elytra with deeper, less regular punctures, those near base varying from subcontiguous to one or two diameters apart, becoming a little smaller, but still dense toward apex; apices emarginate, the outer angle produced, acute but not spiniform. Length 13.5 mm.

The type, a male, is from Honduras.

PSYRASSA ALIENA (Linsley), new combination

Stizocera aliena Linsley, 1934, Psyche, 41:235.

This species, doubtfully referred to *Stizocera* when originally described, appears to be better referred to *Psyrassa* than to any of the other genera here recognized. It differs from most of the presently included species in the somewhat heavier spines of the third and fourth segments of the antennae, although that of the third segment is disproportionately long, and the transversely rugose pronotum. The scutellum, meso- and metepisterna and an adjacent narrow band along margin of metasternum, and the tarsi are densely golden pubescent.

Genus STENOSPHENOPSIS Linsley

Stenosphenopsis Linsley, 1935, Trans. Amer. Ent. Soc., 61:95.

This is a monotypic genus which differs from *Ironeus* by having the intermediate coxal cavities closed externally and the eyes very finely faceted. From *Stenosphenus* it may be distinguished by the tuberculate mesosternum and clavate femora. The type species, *S. nitidus* Linsley, is from Bejucos, District of Temascaltepec, Mexico.

Genus STENOSPHENUS Haldeman

Stenosphenus Haldeman, 1847, Trans. Amer. Philos. Soc., 10:39; Lacordaire, 1869, Genera Coleopt., 9:130; Bates, 1880, Biologia Centrali-Americana, Coleoptera, 5:65, 312.

About 25 species of this genus are now known from Mexico and Central America. Others await description. The type of the genus, *Callidium notatum* Olivier, is from eastern United States.

Genus IRONEUS Bates

Ironeus Bates, 1872, Trans. Ent. Soc. London, 1872:178; Bates, 1880–1885, Biologia Centrali-American, Coleoptera, 5:29, 255.

This genus is apparently related to *Stenosphenus* and tends to approach it in the finer faceting of the eyes. Three species are known, distinguishable as follows:

1. Elytra thinly pubescent, surface not obscured by tomentum.....2
– Elytra densely clothed with yellowish tomentose pubescence except for suture and three longitudinal vittae, of which the second is the most prominent; head including antennal scape, prothorax, and femora rufo-testaceous. 11 mm. Nicaragua to central Mexico.....*pulcher*
2. Black with head and pronotum bright red; antennae of male but little longer than body. 10.5 mm. Southern Mexico.....*mutatus*
– Black with femora bright red; antennae of male nearly twice as long as body. 11–12.5 mm. Nicaragua to northern Mexico.....*duplex*

Genus Mallocera Serville

Mallocera Serville, 1833, Ann. Soc. Ent. France, 2:567; Aurivillius, 1912, Coleopt. Catal., 39:100.

As restricted by Aurivillius (1912), this genus contains only one described species in Central America, *M. spinicollis* Bates from Nicaragua.

Genus Paramallocera Aurivillius

Paramallocera Aurivillius, 1912, Coleopt. Catal., 39:100.

A genus largely confined to South America, one species, *P. cribripennis* (Bates), extending its range into Central America (Panama).

Genus Pseudoperiboeum Linsley

Pseudoperiboeum Linsley, 1935, Trans. Amer. Ent. Soc., 61:77.

Known only from the type species, *P. subarmatum* Linsley, from central Mexico.

Neotrichophoroides Linsley, new genus

Moderate-sized, parallel-sided, somewhat depressed. Integument shining, distinctly punctate, with scattered patches of dense, appressed pubescence, in addition to scattered erect hairs. Head with eyes coarsely faceted; antennae with third segment much longer than fourth, fourth not or scarcely as long as fifth, spines present on segments three to six, carinae indistinct beyond fourth segment. Pronotum a little broader than long, sides obtusely rounded, with a median dorsal polished callous and a pair of arcuate polished callouses at margin of disk, intermediate area coarsely, densely punctate; prosternal process arcuate posteriorly; intermediate coxal cavities narrowly open externally. Elytra with apices rounded to the suture; femora unarmed gradually enlarged, not clavate and pedunculate, apices without spines, at most feebly dentate; tibiae carinate.

Type of Genus: *Trichophorus decipiens* Bates.

Differing from the superficially similar *Trichophoroides* and *Eutrichophoroides* by the gradually enlarged posterior femora which are not clavate or pedunculate.

Neotrichophoroides decipiens (Bates)

Trichophorus dicipiens Bates, 1880, Biol. Centr.-Amer., Coleoptera, 5:26.

The type of *N. decipiens* (Bates), from the River Sartoon, British Honduras, is a reddish-brown female, 20 mm. in length. A female example from Esteli, Nicaragua, April 2, 1943 (T. Aitken) is smaller than the type (15 mm.) and brown, rather than reddish-brown.

Neotrichophoroides aurivillii Linsley, new species

Male: Dark brown, appendages reddish; integument sparsely pubescent, with condensed patches of tawny tomentum on front of head, each side of

pronotal disk, and all of scutellum and a very few patches of white pubescence on elytra. Head coarsely punctate except for a smooth area between upper lobes of eyes; antennae slightly exceeding elytral apices, third and fifth segments subequal in length, fourth shorter, carinae distinct over seventh segment, at least, third and fourth segments distinctly spinose at apex, fifth minutely spiculate. Pronotum slightly longer than broad, median smooth area extending from base nearly to apex, an irregular suboval callous on each side anterior to middle and an elongate callous on each side just lateral to and behind the anterior callouses, remaining discal area finely densely punctate, with a few coarse depressed tawny hairs. Elytra very coarsely, densely punctate but the narrow interspaces shining, the discal punctures becoming smaller and shallower toward middle, the lateral punctures beyond middle, surface uniformly sparsely clothed with coarse suberect hairs which are somewhat longer apically; apices emarginate, sutural angle dentiform, outer angle more prominent, subspiniform. Legs sparsely pubescent. Length 12 mm.

Holotype male, CHIRIQUI, PANAMA, in the Naturhistoriska Riksmuseets, Stockholm.

This species may not be strictly congeneric with *N. decipiens* (Bates), since the elytral apices are emarginate with the inner angle dentiform, the outer angle subspiniform, the antennae are carinate over the seventh segment at least and the third segment is no longer than the fifth, and the pronotal sculpturing is quite different. However, *N. decipiens* is known only from the female, *N. aurivillii* only from the male, and it is possible that at least some of these differences are sexual.

Genus AXESTINUS LeConte

Axestinus LeConte, 1873, Smithsonian Misc. Coll., 11(264):177; Linsley, 1936. Ann. Ent. Soc. Amer., 29:469.

Protoneidium Bates, 1892, Trans. Ent. Soc. London, 1892:149.

The synonymy of *Protoneidium* Bates, and its type species *P. brevicorne* Bates, with *Axestinus* LeConte, and its type species *A. obscurus* LeConte, reconfirmed by examination of the types, has been reported previously (Linsley, 1936), but was overlooked in the Blackwelder checklist (1946, Smithsonian Inst., Bull. 185(4):564).

Meganeflus Linsley, new genus

Form moderately large, elongate, parallel-sided, subcylindrical with elytra somewhat depressed and flattened. Integument polished, shining, pubescent, except for scattered long erect hairs. Head with eyes coarsely faceted; antennae eleven-segmented, slightly longer than the body in the the male, a little shorter than the body in the female, third and fourth segments

sulcate, remainder obtusely carinate above, relatively slender, scarcely expanded externally, third to seventh segments spinose at apex, eleventh segment appendiculate. Pronotum subquadrate but obtusely rounded at the middle, dorsal surface uneven; prosternum with intercoxal process arcuate behind and slightly expanded at the apex, coxal cavities very slightly angulate externally; intermediate coxal cavities open to epimeron; episterna of metasternum narrow. Legs slender, femora of intermediate and posterior pairs not clavate or pedunculate, without apical spines, the tibiae carinate externally. Elytra prominently bispinose at apex.

TYPE OF GENUS: *Aneflus? fulvipennis* Bates.

This genus is of the size and general form of *Aneflus* but differs in the shining glabrous elytra.

MEGANEFLUS FULVIPENNIS (Bates)

Aneflus? fulvipennis Bates, 1892, Trans. Ent. Soc. London, 1892:148.

Meganeflus fulvipennis is brownish-piceous with the elytra brownish-testaceous, with the elevated sutural, apical, and lateral margins and the apical spines black. It has been found in the Mexican state of Vera Cruz and in British Honduras (Punta Gorda).

Genus ANEFLUS LeConte

Aneflus LeConte, 1873, Smithsonian Misc. Coll., 11(264):185; Linsley, 1936, Ann. Ent. Soc. Amer., 29:469.

Protaneflus Linsley, 1934, Psyche, 41:233.

This genus is represented in Mexico by at least seven species: *A. cylindricollis* Bates, *A. basicornis* Linsley, *A. rugicollis* Linsley, *A. pubescens* (Linsley), *A. paracalvatus* Knull, *A. prolixus* LeConte, and *A. protensus* (LeConte). Others undoutedly occur in the northern regions near the Arizona border.

ANEFLUS (PROTANEFLUS) PUBESCENS Linsley

Protaneflus pubescens Linsley, 1934, Psyche, 41:233.

The antennae in this form are twelve-segmented in the male, eleven-segmented in the female. It is closely related to *A. cylindricollis* Bates. Examples have been seen from Guatemala, Costa Rica, British Honduras and Panama.

Genus ANEFLOMORPHA Casey

Aneflomorpha Casey, 1912, Mem. Coleoptera, 3:293; Linsley, 1936, Ann. Ent. Soc. Amer., 29:472.

To the six Mexican species previously assigned to this genus (*A. australis* Linsley, 1942, and *A. rosaliae* Linsley, 1942, were omitted from the Blackwelder checklist), the following should be added:

ANEFLOMORPHA CRIBELLATA (Bates)

Psyrassa cribellata Bates, 1892, Trans. Ent. Soc. London, 1892:152.

Dark brown, elytra a little paler. Antennae probably not exceeding elytral apices, fourth segment distinctly shorter than third and subequal to fifth, third to seventh segments spinose at apex, spine of third segment acute, about half as long as fourth segment, spine of fourth segment a little shorter than that of third, of fifth and sixth segments successively shorter that of seventh minute, spiculiform. Pronotum distinctly larger than broad, constricted at base, coarsely, densely, contiguously and to some extent confluently punctate, with an irregular narrow median longitudinal smooth area behind middle. Elytra coarsely densely punctate, basal punctures separated by one diameter or less, becoming smaller behind middle and shallower less well defined toward apex; pubescence unform, short, recurved, pale, without an intermixture of erect hairs, apices narrowly but distinctly emarginate, the angles distinct but not produced. Length 15 mm.

The short recurved rather than appressed pubescence which does not obscure the surface appears to be a distinctive feature of this species. The type is from Acapulco, Guerrero.

Genus ANEPSYRA Casey

Anepsyra Casey, 1912, Mem. Coleoptera, 3:293; Linsley, 1935, Ann. Ent. Soc. Amer., 29:476.

This genus now contains four Mexican species, *A. volitans* LeConte, *A. gracilis* Linsley, *A. mexicana* Linsley, and *A. grandicolle* Linsley. This last was omitted from the Blackwelder checklist. The West Indian species described by Fisher as *Anepsyra jaumei* (1935, Proc. U.S. National Museum, 83:193) does not appear to be congeneric with these. It is closer to *Psyrassa* and should probably be assigned to a new genus.

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A NEW SPECIES OF PURPURICENUS FROM TEXAS

(Coleoptera: Cerambycidae)

JOHN A. CHEMSAK

University of California, Berkeley

In the course of a National Science Foundation sponsored study of North American Cerambycidae, the following apparently new species of *Purpuricenus* was discovered in the collection of the Museum of Comparative Zoology, Harvard University. I am indebted to P. J. Darlington, Jr., of that institution; to E. G. Linsley, University of California, for the opportunity of describing

this species; and to J. N. Knull, Ohio State University, for the loan of specimens of *P. opacus* (Knull) for comparison.

Purpuricenus linsleyi Chemsak, new species

Female.—Form large, robust; color black, opaque, elytra reddish orange at about basal one-half, apical dark area extending obliquely along suture to mid elytra or slightly beyond; pubescence short, sparse. *Head* very coarsely contiguously punctate on vertex between antennal tubercles; pubescence short, rather sparse; antennae a little shorter than elytra, black with a violaceous cast, rather densely clothed with short dark appressed pubescence. *Pronotum* wider than long, constricted at base, prominent lateral tubercle a little behind middle; disk with five prominent calluses, median one most prominent, partially glabrous; punctures on calluses coarse, contiguous, finer on surrounding areas; pubescence sparse, subdepressed; prosternum transversely impressed, rather finely punctate before impression, pubescence moderately dense; meso-and metasternum finely densely punctate, densely pubescent. *Elytra* twice as long as broad; surface densely, moderately coarsely punctate at base, punctures becoming much finer and denser apically, basal punctures smaller than largest of pronotum; short dark hairs rising out of each puncture; apices emarginate truncate; scutellum densely pubescent, not sharply pointed at apex, as long as broad. *Legs* stout, robust; posterior femora exceeding elytral apices; hind femora moderately densely punctate, rather densely clothed with long recumbent hairs. *Abdomen* finely, moderately densely punctate, sternites glabrous apically; fifth sternite densely pubescent, apex broadly, shallowly emarginate. Length, 21–23 mm.

Holotype female, bearing the label "Tex.", with no other data. One paratype (female) with the same locality label.

This species can be readily differentiated from all other North American *Purpuricenus* by its robust size and oblique black elytral pattern covering only about one-half of the dorsal surface. *P. linsleyi* differs from *P. humeralis* (Fabricius) by the reduced dark elytral area, much denser and finer elytral punctures, and smaller, denser pronotal punctation. The longitudinally impressed scutellum, finer pronotal punctures and transverse elytral black pattern will separate *P. axillaris* Haldeman from *linsleyi*. *P. opacus* (Knull) and *P. dimidiatus* LeConte differ at once by the color and elytral pattern and the latter is further characterized by the reduced lateral pronotal tubercles.

The type is deposited in the collection of the Museum of Comparative Zoology at Harvard and the paratype in the California Insect Survey, Berkeley.

I take pleasure in naming this species in honor of Professor E. G. Linsley, University of California, Berkeley.

PHYRDENUS MURICEUS (GERMAR) ATTACKING TOMATOES IN ARIZONA

(Coleoptera: Curculionidae)

CHARLES W. O'BRIEN
University of California, Berkeley

A series of curculionids, found within the roots of tomato plants at Bisbee, Cochise County, Arizona, on December 1, 1958, was brought to the University of Arizona Experiment Station, Tucson, for identification. Included in the series were six teneral adults, twenty-two pupae, and fifteen larvae. The adults were identified by me as *Phyrdenus muriceus* (Germar). Casey (1892) described an Arizona specimen of this species as *bullatus*, but Champion (1905) placed the name in synonymy with *muriceus* (Germar).

The University of Arizona collection has eight pupae taken in dying tomato stems at Naco, Cochise County, Arizona, in August, 1957. After comparison with the Bisbee pupae, these proved to be *Phyrdenus muriceus* (Germar). Five adults in the collection, also taken on tomato, are from St. David, Cochise County, Arizona, June 18, 1940. Four others from tomato in Cochise County, July 30, 1940, are in the collection of the California Academy of Sciences.

Tomato has not been recorded previously as a host for *Phyrdenus muriceus* (Germar). In Arizona it has been reported infesting eggplant in Oak Creek Canyon, Coconino County, in August, and destroying seventy-five per cent of the crop (Brisley, 1930). Eggs were found in the soil, larvae in roots and stems, pupae in earthen cells near the roots, and adults feeding on the stems near the ground level. Although tomatoes, peppers, and several other truck crops as well as several weeds, including *Datura meteloides* D. C., grew nearby, these were not infested throughout the season. In Cuba the larvae also are known to damage young eggplants by boring in the stem close to the ground, and the adults by feeding on the foliage, evidently at night (Bruner and Valdés Barry, 1953).

The adult of this species is a typical Cryptorhynchini with the snout resting in the sternal groove. Specific characters are: eyes nearly covered by ocular lobes; prothorax tuberculate and coasely sculptured; elytra with alternate intervals elevated, and with short, broad setae on the intervals; strial punctures coarse

and shallow; tibiae feebly spined at the apex; and tarsal claws very widely divergent and toothed. Also, the prothorax and the elytra are densely covered with gray to brown, oval, recumbent scales. The adults range in length from 3.5 to 7.8 mm.

The pupa closely resembles the adult, but lacks scales and has many long setae. Intervals on the elytra have interrupted rows of spines.

The larva is of the typical curculionid form. It is distinctly crescent-shaped with the segments showing three dorsal plicae. The mid-abdominal segments are distinctly larger than the thoracic or the caudal segments of the abdomen. It has no true legs or prolegs, and the spiracles are of an annular, biforous type. The head is brown-pigmented with clypeus and labrum fused. One pair of ocelli is present; the antennae are one-segmented, tiny rudiments near the base of the mandibles. There is no molar area or retinaculum on the mandible. Each of the specimens examined had the abdomen nine-segmented. They ranged in length from 6.0 to 12.5 mm.

Another weevil that may be found in tomato stems is *Trichobaris trinotata* Say. The adult and pupa can be separated easily from those of *Phyrdenus muriceus* because they lack ocular lobes and have no sculpturing on the prothorax or elytra. The beak is not received in a groove in the sternum. Although the larvae of the two species are nearly identical, that of *T. trinotata* has ten distinct abdominal segments, and the segments of the body are subequal in length and width, giving it a more uniform appearance.

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STRIDULATION IN THE GENUS IPS DE GEER

(Coleoptera: Scolytidae)[1]

DAVID L. WOOD

University of California, Berkeley[2]

The stridulating organ described for the female of *Ips sexdentatus* Boern. by Nunberg (1950) has been found on the female of *Ips confusus* (LeConte), *I. ponderosae* Swaine and *I. oregonis* (Eichhoff). This organ and the sound produced provide a simple, reliable technique for sex determination. As far as is known, this is the first New World record for the presence of a stridulating organ in the genus *Ips*. Hopkins (1915) reported that "the stridulating accessories (of Scolytid beetles) appear to be confined largely to the seventh abdominal tergite and the inner subapical area of the elytra and to the anterior margin of the pronotum and the posterior dorsal area of the head." In correspondence with Keler (see Numberg, 1950), Hopkins wrote that he found the organs at the back of the head in species of *Ips* but that he thought they were confined to the male. According to my observations, the males of the above three species do not possess a stridulating accessory on the posterior region of the head as Hopkins states. Sex has been verified in all cases by dissection. Preliminary observations confined to a small series of *I. radiatae* Hopkins and *I. emarginatus* (LeConte) did not reveal the presence of a stridulating accessory on the head of either the male or female.

Stridulation is readily heard if the female is held close to the ear between the thumb and forefinger so that the head is permitted to move freely. However, it was found that *Ips* did not stridulate as readily as *Dendroctonus* when held in this manner. To encourage stridulation the insect may be rotated between the fingers. If stridulation is heard, the sex is undoubtedly female while the sex of the non-stridulating individuals may be verified by squeezing the beetle gently while holding it by the sides. The head will protrude and drop down from beneath the pronotum and the presence or absence of the pars stridens[3] (Dudich, 1920)

[1] Study performed under partial support from the California State Division of Forestry, the T. B. Walker Foundation, and various forest industries.

[2] Assistant Entomologist, Department of Entomology and Parasitology, University of California, Berkeley.

[3] pars stridulans (Imms, A.D. 1957. A General Textbook of Entomology. Methuen & Co. London, p. 116).

on the posterior dorsal area of the head (figure 1) is readily determined. This file-like area is easily visible in these three relatively large species at a magnification of 10X. The complementary organ, the plectrum, is located on the inner surface (anterior one-third) of the pronotum.

Explanation of Figures

Left figure: a view of the exposed posterior dorsal region of the female head showing the location of the pars stridens on *Ips ponderosae* Swaine (×25). Right figure: a similar view of the male (×25).

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STRYMON MELINUS ON BEAR-GRASS, AN ANT SYMBIONT, AND PARASITES FROM REARINGS IN ARIZONA

(Lepidoptera: Lycaenidae)

G. ALLAN SAMUELSON

University of Arizona, Tucson

A total of fifty larvae of *Strymon melinus* Hübner were collected on the flowering panicles from three plants of bear-grass, *Nolina microcarpa* Wats. (Liliaceae), Molino Basin, 4480 ft., Santa Catalina Mountains, Pima County, Arizona on 12 June 1960. From this material, each host plant contained four larval instars, which might suggest different oviposition dates or incubation periods of ova. There was some variation in coloration of all observed larval instars, with ninety percent closely matching the straw color of the flowers and the remainder ranging from brilliant lime-green to pink.

Feeding activity was largely confined to two portions of the host plant, with the ultimate and penultimate instars feeding on the flowers, and the earlier instars feeding on the stem proximad to the bracts of the plant. Ultimate instar larvae were occasionally present on the basal portion of the bracts, but were never seen feeding there.

The larvae were obviously attended by workers of a conspicuous black ant, *Camponotus ulcerosus* Wheeler. Those larvae which were generally well concealed on the host plant were easily detected by the presence of the symbionts. When engaged with the lycaenid, the ants continually combed the entire dorsum of the larva with their flagellar antennal segments using brisk, sweeping strokes. This association was observed for forty-five minutes in the field where numerous encounters were noted. The combing intervals ranged from 0.25 to 1.50 minutes with considerably more time (one minute or more) spent on the larger, later instar larvae. These symbionts were frequently observed walking upon the dorsum while combing the larger larvae. This is possibly a result of the linear or lengthwise approach made by the ant to the larva during most combing engagements noted.

This material was taken home for rearing and placed in one gallon wide-mouth jars. On 24 June, adults of a braconid, *Apanteles* sp. (possibly *A. theclae* Riley) appeared. Upon closer examination, further indication of parasite activity was noted by the exit of *Apanteles* larvae from lycaenid hosts and subsequent white

cocoons of the parasite in the vicinity of the host. The duration of pupation of this parasite ranged from 72 to 96 hours. Although the healthy appearing lycaenid larvae were isolated at this time, it was essentially too late as eighty percent (40 larvae) of the individuals had become parasitized by this braconid.

A total of ten lycaenids pupated. Four perfect *Strymon melinus* emerged following a pupation period of 9 to 11 days. Three pupae were parasitized by a large chalcid, *Metadontia amoena* (Say), with one individual per host. The emergence of these occurred 20, 21, and 35 days following pupation of their respective hosts. A single pupa of thirteen days duration produced a mass emergence of the eulophid, *Tetrastichus lissus* Burks. The remaining two pupae turned greasy with no further development.

The status of *Nolina microcarpa* as a larval food plant for *Strymon melinus* appears not to have been previously recorded. From my observations and rearing, this euryphagic lycaenid appears to be well established on it as a normal food plant in this area. The association between the ant, *C. ulcerosus* and *S. melinus* is also apparently unreported. The distribution of this ant is not widespread and appears limited to a few localities in the mountains of southern Arizona in which it is essentially a member of the Upper-sonoran biota along with bear-grass. The parasites reared, although possible extensions of earlier records, do contribute as important dynamic entities in the ecology of this host population associated with bear-grass.

I extend sincere acknowledgments to Drs. B. D. Burks and M. R. Smith, United States National Museum, who respectively determined the eulophids and confirmed the identity of the formicids, and to Dr. F. G. Werner, University of Arizona, who determined the chalcid.

ENTOMOLOGICAL SOCIETY OF AMERICA

The 1961 meeting of the Entomological Society of America will be held in the McAllister Hotel, Miami, Florida, November 27–30. Details for presentation of papers will be found in the Bulletin of the Entomological Society of America, volume 7 (June, 1961).—*Editor*

PRIMARY LARVAE OF CISSITES ASSOCIATED WITH NEW WORLD CARPENTER BEES

(Coleoptera-Meloidae: Hymenoptera-Xylocopidae)

J. W. MacSwain
University of California, Berkeley

Recently several authors, Enns (1958), Selander (1959), and Selander and Bouseman (1960) have published extensive collection records of the adults of the two New World species of *Cissites*. Independently my colleague, Paul D. Hurd, Jr., has discovered numerous first instar larvae of these same species clinging to the hairs of their host bees, *Xylocopa* species. These byproducts of his study of the New World carpenter bees are gratefully acknowledged and form the basis for the following contribution. He is responsible for the identification of the carpenter bees reported herein.

Since *Cissites maculata* (Swederus) is the only species known to occur in South America and *Cissites auriculata* (Champion) is the dominant species encountered in Mexico, it was possible to determine which of the two dominant larval types was associated with the two adult forms. The primary larvae of these two species are very similar and can be separated best by a minor difference in the relative lengths of the setae in the posterior marginal rows of the metasomal tergites. These differences are more pronounced on the anterior tergites as indicated by the following key:

Primary larvae with third pair of setae of posterior marginal row on metasomal tergites one to five subequal in length to median pair of setae of same row ..... *auriculata*

Primary larvae with third pair of setae of posterior marginal row on metasomal tergites one to five considerably longer than median pair of setae of same row ..... *maculata*

Some or all of the primary larvae were removed from the adult bees and mounted on slides in diaphane. These slides will be returned to the institutions which furnished the adult bees to Dr. Hurd.[1] Abbreviations for these institutions for use in the distribution records are as follows: American Museum of Natural History (A.M.N.H.); Academy of Natural Sciences, Philadelphia (A.N.S.P.); California Academy of Sciences (C.A.S.); California Insect Survey, University of California, Berkeley (C.I.S.); Cornell

[1] The exact label data of each bee is recorded on the slides and is given in the distributional records cited below. The position of the larvae on the bees was extremely variable and, therefore, is not recorded.

University (C.U.); Kansas University (K.U.); Los Angeles County Museum (L.A.C.M.); Museum of Comparative Zoology, Harvard University (M.C.Z.); United States National Museum (U.S.N.M.); and University of California, Riverside (U.C.R.).

CISSITES AURICULATA (Champion)

MEXICO: *Xylocopa cyanea* Smith, ♂, Ixtapan de la Sall, Mex., Mexico, 5500 feet, VIII-9-1954, 1 larva (K.U.); *Xylocopa fimbriata* Fabricius, ♀, Vera Cruz, Mexico, II-12-54. R. R. Dreisbach, 1 larva, (K.U.); *Xylocopa guatemalensis* Cockerell, ♂, Cuernavaca, Mexico, Nov. 5, 1922, E. G. Smyth, 136 larvae (U.S.N.M.); *Xylocopa guatemalensis* Cockerell, ♀, 15 mi. S. Cuernavaca, Mexico, XI-15-46, F. E. Skinner, collector, 27 larvae, (U.C.R.); *Xylocopa guatemalensis* Cockerell, 2♀, 20 mi. S. Taxco, Mexico, II-6-54, R. R. Dreisbach, 2 larvae, (K.U.); *Xylocopa mexicanorum* Cockerell, ♀, Chilpancingo, Guerrero, Mexico, June 30, 1951, P. D. Hurd, collector, 2 larvae, (C.I.S.).

HONDURAS: *Xylocopa fimbriata* Fabricius, ♀, Zamorano, 20 mi. from Tegucigalpa, Rep. Honduras, T.D.A. Cockerell, 24 larvae, (M.C.Z.).

An unrecorded adult of *C. auriculata* was collected by P. H. Timberlake at Alamos, Sonora, Mexico, on January 7, 1951 and is in the collection of the University of California at Riverside. This specimen extends considerably the known distribution of this species in northwestern Mexico.

The suggestion of Selander and Bouseman (1960) that *Cissites* may oviposit in the burrows of the host bee, as is the case in the related Old World species, *Synhoria testacea* (Fabricius), appears likely from the small number of *Xylocopa* species associated with larvae of *Cissites* in the present paper, the number of times that larvae have been taken on males and females of a single bee species and the large number of larvae (136, 27, 24) that occur on an individual bee. In nemognathine meloid genera which oviposit on flowers, the larvae cling to a variety of flower-visiting insects but never in large numbers on any one insect. By contrast larvae of the genus *Hornia*, which oviposits in the burrow of its host bee, may occur in large numbers on single bees. MacSwain (1958) has recorded 20, 29, 37, and 131 larvae of *Hornia* on four adults of the host bee, *Anthophora marginata* Smith. It seems likely that the four species of *Xylocopa* noted above will prove to be hosts of *Cissites auriculata*. The two associations with *Xylocopa fimbriata* are of particular interest since in Panama this bee, as noted below, also is associated with *Cissites maculata*.

CISSITES MACULATA (Swederus)

ARGENTINA: *Xylocopa augusti* Lepeletier, ♀, Buenos Aires, Arg., II-1950, M. Senkute, 1 larva, (K.U.). *Xylocopa ciliata* Burmeister, ♀, San Pedro de Colalao, Trancas, Tucuman, Arg., II-1950, Arnau, J. Foerster, 1 larva, (K.U.). *Xylocopa nigrocincta* Smith, 3♀, Rep. Argt., Terr. Formosa, Gran Guardia, (2) I-20-53, (1) III-53, J. Foerster, collector, 4 larvae, (K.U.). *Xylocopa splendidula* Lepeletier, ♀, La Rioja, Argentina, S.A., Ac. 5165, 1 larva, (A.M.N.H.); ♂, La Rioja, W. Argentina, B. P. Clark, donor, 4 larvae, (U.S.N.M.); ♀, La Rioja, Argentina, E. Giacomelli, 7 larvae, (C.U.).

BRAZIL: *Xylocopa frontalis* (Olivier), ♂, Corupa (Hansa-Humboldt), S. Cath., Brazil, X-44, A. Maller, collector, Frank Johnson, donor, 3 larvae, (A.M.N.H.); ♀, Annapolis (Anápolis, Brazil), Goiaz, VII-3-36, G. Fairchild, collector, 12 larvae, (M.C.Z.); ♀, S. Bento, D. Caxias, Est. Rio de Janeiro, Brasil, XI-1953, P. A. Teles, collector, 1 larva, (K.U.); ♀, 24 kil. E. Formoso, Go., Brazil V-17-1956, M. and P. Machlis, collectors, 6 larvae, (L.A.C.M.). *Xylocopa grisescens* Lepeletier, ♀, Ceara, Serra de Baturite, 600 m., 25-7-08, Ducke, P. Herbst collection, Ex. Reed, 2 larvae, (C.A.S.). *Xylocopa nigrocincta* Smith, ♀, S. Bento, Duque de Caxias, Est. do Rio, Brasil, VII-11-954, P. A. Teles, 1 larva, (K.U.). *Xylocopa ordinaria* Enderlein, ♀, S. Bento, Duque de Caxias, Est. do Rio Brasil, VI-24-954, P. A. Teles 3 larvae, (K.U.); *Xylocopa varians varians* Smith, 2♂, Nova Teutonia, Santa Caterina, Brazil, XII-1951, L. E. Plaumann, 5 larvae, (K.U.).

COLOMBIA: *Xylocopa frontalis callichlora* Cockerell, ♀, Hacienda Garcia, Cauca Valley, Colombia, I-27-35, W. Eder, collector, 1 larva, (A.M.N.H.)

PERU: *Xylocopa bruesi* Cockerell, ♀, 35 mi. E. of Abancay, Peru, III-5-51, Ross and Michelbacher, collectors, 1 larva, (C.A.S.). *Xylocopa lehmanni* Friese, ♀, Huanta, Peru, III-8-1951, Ross and Michelbacher, collectors, 4 larvae, (C.A.S.).

URUGUAY: *Xylocopa augusti* Lepeletier, ♀, Uruguay, J. Wyman, 1 larva, (M.C.Z.); ♀, Florida, Uruguay, I-1952, J. Foerster, 1 larva, (K.U.).

GALAPAGOS ISLANDS: *Xylocopa darwini* Cockerell, ♀, S. Seymour Island, Galapagos, numerous larvae, (M.C.Z.).

PANAMA: *Xylocopa fimbriata* Fabricius, ♀, Old Panamá, Panamá, IV-19-45, C. D. Michener, I larva, (A.M.N.H.); 2♀, Panamá, Saboga (Taboga?) Island, Apr. 1904, W. W. Brown Jr., J. E. Thayer Expd., 2 larvae, (M.C.Z.).

MEXICO: *Xylocopa frontalis nautlana* Cockerell, ♀, Simojovel, Chiapas, Mexico, VIII-5-58, J. A. Chemsak, collector, 9 larvae, (C.I.S.).

WEST INDIES: *Xylocopa mordax* Smith, 2♀, San Domingo, 5 larvae, (A.N.S.P.); ♀, La Vega, R. Dom., V-14-15, 2 larvae, (A.M.N.H.); ♀, Bizeton, Haiti, I-9-'22 F.4613, 2 larvae, (A.M.N.H.); ♀, Fond Parisien, Haiti, II-18-'22, about 60 ft. alt., F.4634, 4 larvae, (A.M.N.H.); ♀, Pivert, Haiti, IV-1-'22, about 250 ft. alt., F.4657, 3 larvae, (A.M.N.H.).

The last record of *Cissites maculata* from Mexico appears to be that of Champion (1892). The specimen from Simojovel, Chiapas, Mexico, is also of interest because of the association

with *Xylocopa frontalis*, a species with which the meloid has been taken in Brazil and Colombia.

The larvae from the Galapagos Islands are unique in being larger than those from any other source. Although this size difference is probably significant, all of these larvae (more than one hundred) were clinging to a single female of *Xylocopa darwini* and may be the progeny of a single *C. maculata*.

Identification of the larva from Old Panama is not certain. While the larvae removed from the two females of *Xylocopa fimbriata* from Taboga Island are unmistakably *C. maculata* the other larva is aberrant. The median setae are of unequal length on the two sides of the metasoma and the species might be *C. auriculata*. In either event, it is clear that *X. fimbriata* is the host of both species of *Cissites*. The present associaion of these meloids with a number of carpenter bee hosts should greatly facilitate future biological studies.

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